THE IRON TRADE REVIEW

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FAR AHEAD

ARE BUYERS LOOKING IN PLACING ORDERS.

Strong Evidence of Permanence of Prosperity.—Pig Iron Prices Higher.—Heavy Buying of Finished Materials.

That the present prosperity is solid and will in all probability continue for at least six months longer is shown by the growing disposition to contract for future requirements. This is true from the buyer of ore, who intimates to the seller that he expects to be taken care of for his needs after May of next year, to the users of all kinds of finished materials. Recent reports of crop conditions have added to the feeling of confidence. Another satisfactory condition is the absence of all speculation, as iron and steel products are being sold directly to consumers. There are no indications of boom conditions and all conservative interests will endeavor to prevent such a turn, as the inevitable result would be disastrous reaction.

Pig Iron Is Strong

The pig iron market shows increased strength with quotations slightly advanced. The leading sale of the week was 25,000 tons of southern iron to the principal harvester interest at about $13 Birmingham. This price is considerably below the quotation for ordinary business. Some southern interests have withdrawn from the market, believing that at a not far distant date a $14 quotation will take business. In the east the demand for foundry iron continues strong. In Philadelphia there is already talk of buying for 1907. In the valleys all grades have advanced from 25 to 50 cents, and there is very little iron to be had for the last half of this year. Unusual quantities of pig iron are being shipped from southern points to Pittsburg.

Sheet Bars Purchased.

Pittsburg interests which are generally sellers of billets are out of the market on account of needing their product for their own mills. Sheet bars are being shipped to Pittsburg from unusual sources on account of inability of mills in that section to meet the demand. The Atlanta, Ind., sheet mill has made a purchase of 5,000 tons of sheet bars from the Tennessee-Republic interest. The scarcity of rods has not been relieved.

Railroads Buying.

About 53,000 tons of standard section rails have been sold during the week, and there is very little tonnage available for 1906 delivery. The Southern railroad has placed an order for 30,000 tons, Pittsburg & Lake Erie for 10,000 tons and Lehigh for 5,000 tons, all for 1907 delivery. Railroads are buying track supplies freely, and the contracting for cars continues. Railroad requirements for iron and steel bars will be heavy. Jobbers are active in providing for their supplies of bars.

Plates and Shapes.

The placing of orders for boats for the ore traffic within a few days adds about 1,750,000 tons to the lake vessel capacity for the season. The new vessels will require about 35,000 tons of plates and shapes. The placing of orders has been followed by heavy contracting for steel, the orders for plates and shapes being divided among the Illinois Steel Co., Carnegie Steel Co., Jones & Laughlin Steel Co., and the Lackawanna Steel Co. The demand for structural material for buildings indicates that many new industrial plants are being erected. A large tonnage is also going into new bridges.

Heavy Pipe Orders.

The Devonian Oil Co. has placed an order for 65 miles of steel line pipe and 19 miles of iron line pipe, which will be laid in the Indian Territory. A large number of sales of smaller quantities was made. The city of Chicago has placed orders for 8,500 tons of cast iron pipe, and Cleveland, Dayton and other cities have advertised for bids.

HEAVY INCREASE

In Ore Shipments From Head of Lakes.—Mahoning Ore Deal.

Duluth, July 23.—The shipment figures of ore from the head of the lakes as just received show that there were shipped during the week from Two Harbors 284,886 tons, from Duluth 459,211 tons and from Superior 237,321 tons, a total from the three ports of 981,418 tons, which is 187,238 tons better than the preceding week. Last year for the corresponding week Two Harbors shipped 301,110 tons, Duluth 327,635 tons and Superior 177,700 tons, aggregating 806,445 tons, showing an increase this year for the week to be 174,973. The shipment to date has been 10,166,205 tons as compared with 9,329,837 tons up to this time last year, a gain of 836,368 tons, which increase makes good the falling off last week.

A deal has just been completed whereby the Mahoning Ore Co., operating the Mahoning mine, W. C. Agnew, manager, has obtained a dumping ground of which it was in considerable need. In addition the Roberts-Kingston Contracting Co. of Duluth has provided for the mining of the ore in the southwest of the southwest of section 35, 58-21, which land it has held for some time under lease from the Longyear-Bennett interests. This forty adjoins the Mahoning mine and the Roberts-Kingston Co. has just obtained an option on an adjoining 80 acres, which it has turned over to the Mahoning Ore Co. for a dumping ground in consideration of which the Mahoning Ore Co. is to mine the ore in the other party's property. The agreement provides for an equivalent credit on ore taken out of the Mahoning mine in case the new property is not opened up at once and Harry Roberts has just been in Cleveland arranging for the sale of the ore.

The Toledo Furnace Co., has its stack at Toledo, O., again in blast.

THE WEEK IN IRON CENTERS.

PITTSBURG.

Healthy Demand With Advancing Prices.—Crude Steel Increasingly Scarce.

OFFICE OF *The Iron Trade Review*,
521 PARK BUILDING, July 24

Throughout the week there has been a strong, healthy demand in all branches of the steel business and despite the fact that the vacation season is on in full swing, usually making this the quietest part of the year, there has been some very heavy buying in both pig iron and finished material. The pessimists of two months ago have hauled down their flag and joined in the caravan of those who predicted that the remaining months of the year will bring out an unprecedented amount of business.

The most favorable indication under these circumstances is the total absence of speculation, the material now being ordered going direct to the consumer. There has been no change in the prices of finished material, but pig iron has shown a decided tendency to advance, Northern No. 2 foundry iron selling at $16.75 to $17. Basic iron is quoted $17.25 to $17.50 and Bessemer iron is held at $17.75 to $18.

The finishing mills are in excellent shape as far as business on the books is concerned, their chief concern being deliveries. The leading interest is practically filled to its capacity for the remainder of the year on plates and there is but very little rail capacity open for 1906 delivery. Over 53,000 tons of standard sections have been placed during the week under review and several heavy negotiations are pending with prospects of being closed before the end of the week. The leading producers of semi-finished steel in this district are practically out of the market on steel billets and this has made it possible for interests who usually cannot enter the district in competition with the local mills to place considerable business. The Republic Iron & Steel Co., has announced that it will require its entire billet production during the remainder of the year for its own finishing mills.

Several new projects that, should negotiations now under way be successfully terminated, will greatly add to the output of this district, are being considered.

Pig Iron.—In view of the fact that pig iron has shown a strong inclination to advance in price due to a scarcity that has developed, several transactions involving a considerable tonnage have been made. The advance in prices of northern pig iron has permitted southern and Virginia furnaces to sell into the Pittsburg district in spite of the freights. There are practically no stocks at the furnaces and consumers who have been waiting for lower prices and been buying for immediate requirements from month to month are now out for their requirements for the remainder of the year, the sharp advance proving to be quite a shock There are still a few quotations out at $16.50 valley on No. 2 northern foundry, but they are being withdrawn and on new inquiries $17 is the price being named. One lot of 750 tons sold at $17.20, valley. Corrigan, McKinney & Co., have sold 10,000 tons of northern gray forge iron for delivery through the first quarter of next year at $16 valley. For prompt delivery the same price is quoted. Bessemer pig iron is a scarce article; for anything like prompt shipment, $18 is being asked although an old customer could probably do $17.75 valley. There is a strong demand for basic iron and the minimum market is $17.25, valley. A western consumer of basic iron has covered for his requirements until next February, not caring to take chances of getting caught short under the present conditions. Southern No. 2 foundry is quoted $13.50 to $13.75. Birmingham, and forge at $12, although it is possible to shade both these prices a little, one large southern interest having during the past week sold 10,000 tons into central western territory at $13.25, Birmingham for No. 2. The 1,500 tons of southern forge iron bought by the National Tube Co., last week at under $11 50. Birmingham, was off iron. We quote:

Bessemer Valley	17.75 to 18.00
Bessemer, Pittsburg	18.60 to 18.85
No. 1 Foundry, Pittsburg	18.10 to 18.35
No. 2 Foundry, Pittsburg	17.60 to 17.85
Gray Forge, Pittsburg	16.50 to 16.85
Basic, Valley	17.25 to 17.50
Basic, Pittsburg	18.10 to 18.35

Ferro-Manganese.—Ferro-manganese, foreign, 80 per cent, is an uncertain commodity at the present time, owing to the unsettled conditions in Russia. For September and October delivery $87 to $90 is being quoted and for November and December, $80. Several quotations of $85 for prompt shipment are now out.

Steel.—The local producers of Bessemer and open-hearth billets are practically out of the market, due to the pressure on their finishing departments. Odd lots have cropped out from time to time, but they are few and far between. The Youngstown Sheet & Tube Co., which will be in the market shortly after the first of the month with the product of its new Bessemer department, has sold its output for several months ahead. On account of the scarcity of sheet bars and the fact that local mills are far behind on their deliveries, producers who usually could not get into Pittsburg with their steel in competition with the local interests on account of freight rates, have been able to place their steel and some has been sold at prices below the official Pittsburg figures. We quote Bessemer billets $27 to $27.50 and open-hearth $27.50 to $28, Pittsburg. Sheet bars are officially quoted at $29, but an outside interest has placed a tonnage in Pittsburg at $28.50, absorbing the freight.

Skelp.—The improvement in the tone of the merchant pipe business has brought out some inquiry for skelp. On narrow widths and light gauges we quote:

Bessemer grooved, 1.57½c to 1.60c; sheared, 1.65c to 1.70c; basic grooved, 1.60c to 1.65c; sheared, 1.65c to 1.70c; iron skelp, grooved, 1.65c to 1.70c; sheared, 1.80c to 1.85c.

Muck Bar.—We quote a nominal market of $29 on all pig metal muck bar.

Hoops and Bands.—Specifications against old contracts are good, but the new business is only fair. We continue to quote, unchanged as follows:

Hoops, 1.90c in carload lots, and 2c on less than carload lots, bands, 1.50c base, half extras as per standard steel card. Prices f. o. b. Pittsburg.

Cotton Ties.—There is still considerable business to be placed, but the market is not particularly active. The July price is 86½c per bundle.

Structural Material.—Specifications and shipments are running about even with the mills and the new business is good. There has been a good tonnage placed during the week under review and it is expected the Abram Strauss building in Brooklyn and the City Investment building in New York, the former requiring 4,000 and the latter 12,000 to 14,000 tons will be placed within a short time. Edwin Gilbert, of Philadelphia, secured the contract for the Margaret Morrison building of the Carnegie Technical school. John Eichleay Jr. Co., of Pittsburg, secured the contract for the Presbyterian hospital building in Allegheny. The placing of nine lake freighters for the great lakes gave the mills considerable tonnage, although the greater part

consists of plates. Heavy sections are still in strong demand.

Beams and channels, 15 in., and under, 1.70c; over 15 in., 1.80c; zees, 1.70c; tees, 1.75c; angles from three to six inches, inclusive, 1.70c; over six inches, 1.80c; universal and sheared plates, 6¼ inches and wider, 1.60c base.

Plates.—Nine lake freighters gave the mills about 35,000 tons of plates and shapes during the past week. This business was divided around, the Carnegie Steel Co., getting a large part of the business, while Jones & Laughlin and the Lackawanna Steel Co., each got a share, the latter concern getting one boat to be built for Pickands, Mather & Co. One of the nine boats will be built for W. P. Snyder and another for the J. W. Rhodes interests, both of Pittsburg. The steel car companies are taking business for next year and have made contracts assuring themselves of material. The demand for universal plates is exceedingly good and the leading interest has business on its books to the capacity of its mills for the remainder of the year. The demand for sheared plates by the car companies and the lake ship builders has been heavy. We quote as follows:

Tank plate ¼ inch thick, 6¼ to 100 inches, 1.60c f. o. b. mills, Pittsburg. Light plate schedule, No. 10, 1.70c; Nos. 11-12, 1.75c; Nos. 13-14, 1.80c; Nos. 15-16, 1.90c. Extras on the regular plate schedule are as follows per 100 pounds: Boiler and flange steel plates, 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches excepting straight taper plates, varying not more than four inches, in width at ends, narrowest end not being less than 30 inches, 0.10c; complete circles, 0.20c. Plates in width over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1.00c. Gauges under ¼ inch to and including 3-16 inch plates on thin edges, 0.10c; under 3-16 inch to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms net cash in 30 days.

Merchant Pipe.—Within the past two weeks orders have been placed for line pipe aggregating 200 miles and there are several other large orders pending. The largest individual contract was placed by the Devonian Oil Co. interests with the National Tube Co., for 65 miles of 8-inch steel line pipe and 19 miles of iron line pipe of smaller sizes with the South Chester Tube Co. There have been a number of smaller orders averaging 10 to 15 miles. The Devonian pipe goes to Indian Territory. The merchant pipe situation is strong and jobbers' and mill stocks are for the most part low. While tonnages are good, prices remain unchanged with the extreme discount 81 per cent and 5 off. On pipes we quote the official prices as follows, consumers' car loads, with jobbers' car loads one point higher discount.

	Steel		Iron	
Consumer's Carloads	Black	Galv.	Black	Galv
⅛ and ¼ inch	71	55	67½	51½
⅜ inch	73	59	69½	55½
½ inch	75	63	71½	59½
¾ to 6 inches	79	69	76	66
7 to 12 inches	74	59	71	55½
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch	64	52	60½	48½
½ to 4 inches	71	59	67½	55½
4½ to 8 inches	67	55	63½	51½
Double extra strong plain ends, ¼ to 8 inches	60	49	56½	45½

Boiler Tubes.—There is a fair demand for boiler tubes, but conditions have not changed and we quote as follows:

	Steel	Iron
1 to 1½ inches	50	45
1¾ to 2¼ inches	62	45
2½ inches	64	50
2¾ to 5 inches	70	57
6 to 13 inches	62	45

Less than carload lots two points less.
2½ inches and smaller, over 18 feet, 10 per cent net extra.
2¾ inches and larger, over 22 feet, 10 per cent net extra.

Merchant Bars. — There has been a considerable movement in bar iron during the week under review, the chief buyers, as was the case last week, being railroads. We quote as follows:

Common iron bars, 1.55c, Pittsburg, in carload lots, 1.60c in less than carloads; for western shipment 1.50c base Pittsburg; Bessemer steel bars, 1.50c; plow and cultivator, 1.50c net; channels, angles, zees and tees, under three inches, 1.60c, all f. o. b. Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds, 0.10c advance; less than 1,000 pounds, of a size, 0.30c advance.

Steel Bars.—Implement makers and the nut and bolt interests have specified very heavily during the past week and a large tonnage found its way to the books of the manufacturers, in this way. While there is still a large new tonnage to be placed for the year, it is coming in slowly, the delay being by the smaller interests. Prices remain unchanged and we quote as follows:

Cold rolled and ground shafting, 50 per cent off in carload lots, and 45 off in less than carloads, delivered in base territory; tire steel, 1.70c to 1.80c; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flat, 1.50c to 1.55c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.05c to 2.10c. The price of planished and machine straightened tire is 1.70c base half extras as below. Iron finished tire up to 1½ inch by ½ inch, 1.65c base half extra tire list. Iron finished tire 1½ inch by ½ inch and over to be sold on regular bar basis of 1.50c base; half extra steel card.

Sheets.—Specifications against previous contracts are good, but producers are two to three months behind on deliveries. The scarcity of semi-finished stock is a serious handicap. The independent interests have plenty of business and are now all in operation after the summer shut down. Prices are unchanged and we quote as follows:

Black steel sheets, box annealed, cold rolled, one pass: Nos. 11-12, 2.10c; Nos. 13-14, 2.15c; Nos. 15-16, 2.20c; Nos. 17-21, 2.25c; Nos. 22-24, 2.30c; Nos. 25-26, 2.35c; No. 27, 2.40c; No. 28, 2.50c; No. 29, 2.65c; No. 30, 2.75. Galvanized, Nos. 10-11, 2.45c; Nos. 12-14, 2.55c; Nos. 15-16, 2.65c; Nos. 17-21, 2.80c; Nos. 22-24, 2.95c; Nos. 25-26; 3.15c; No. 27, 3.35c; No. 28, 3.55c; No. 29, 3.80c; No. 30, 4.05c. Corrugated roofing, $1.75 per square for No. 28 painted, 2½-inch corrugation; $3.10 per square for No. 28 galvanized, 2½-inch corrugation. Quotations f. o. b. Pittsburg on large lots.

Tin Plate.—There is very little new business being placed, but specifications against old contracts are heavy and in advance of the usual heavy specification period from corners. We quote:

$3.75 per base box, f. o. b. Pittsburg, 14 x 20 100-pound-cokes, terms 30 days, less two per cent off for cash in ten days.

Rails and Track Material. — The southern railroad has placed a contract with the Carnegie Steel Co., for 30,000 tons of rails for 1907 delivery, the Pittsburg & Lake Erie ordered 10,000 tons for the same delivery and the Lehigh Valley railroad placed for 5,000 tons. The Chicago & Eastern Illinois ordered 5,000 and the Evansville & Terre Haute 1,300 tons for 1906 delivery, while 1,100 tons in smaller lots was placed, making a total of over 53,000 tons placed during the past week. Negotiations are under way for two large contracts for 1907 delivery. The inquiry is very good for standard as well as light sections. The demand for railroad spikes continues very heavy and in some instances from 5c to 10c premium has been offered for prompt delivery and refused. The leading producers are filled until October and are not promising deliveries before that time on new business. We quote:

Fifty pounds and heavier, 500-ton lots and over, $28; carloads and less

than 500 tons, $30; less than carload lots, $32; light rails, 16 pounds, $30; 20 pounds, $28.50; 25 to 45 pounds, $28.50; angle bars for standard sections, 1.50c; spikes, $2.20 to $2.25.

Wire and Wire Nails.—Conditions are very favorable and the demand for plain and barb fence wire and wire nails is heavy and considering the time of year, when most mills are down for repairs and specifications light, indications point to a decidedly prosperous last half of the year. Prices are unchanged as follows.

Wire nails, jobbers' carload lots, $1.85; retailers' carload lots, $1.90, and less than carload lots, $2; painted barb wire, $2 for jobbers in carloads; retailers in carloads, $2.05, and less than carloads, $2.15, with 30c for galvanizing, plain wire, $1.70 to jobbers and $1.75 by carload.

Old Material.—The scrap situation has improved and the consumers of this district have inquiries out for a fair tonnage. Prices are firm and a scarcity has developed in some lines of the business, this being particularly true of heavy melting. The strength of the pig iron market is reflected in the steadiness of the scrap market and the increased demand for old material. We quote, delivered, as follows:

Heavy melting stock, $16; No. 1 cast scrap, $15 to $15.50; cast borings, $9; bundled sheet scrap, $13.50; malleable scrap, $15.50; No. 1 railroad wrought, $16.50; low phosphorus scrap, $18 to $18.50; wrought turnings, $12; busheling scrap, $14 to $14.50; iron axles, $25.50 to $26; old rails, rerollers, $17.50.

Coke.—The scarcity of labor in the coke region is still very serious, although the latest available statistics do not show any marked decrease in production. Strictly high grade Connellsville furnace coke is in good demand and we quote $2.65 to $2.75, ovens, and on foundry coke $2.90 to $3. The estimated production for the upper district for the week ending July 14 was 272,608 and for the lower region 104,565 tons.

Will Erect Furnace.—Another furnace is to be erected near Jackson, O. It will be located on the old Hunsinger farm, west of that city, with ore and coal supplies immediately at hand. The capital stock of $150,000 has been fully subscribed. Moses Morgan, a local coal operator, is promoting the enterprise.

The postal authorities have ruled that rural free delivery mail boxes must be made of galvanized sheet iron or sheet steel.

CHICAGO.

Large Purchase of Pig by Harvester Company.—Market in Good Condition.

OFFICE OF *The Iron Trade Review*,
1.62 Monadnock Block, July 24.

The one remarkable feature of the iron and steel market for a midsummer month, is the uniform buying in all lines. There is no unusual rush for any product, but instead a steady, insistent demand that betokens a remarkably healthy condition of trade. Furnaces and mills in this district have their order books comfortably filled for six to twelve months ahead, and in every case the entire output goes into immediate consumption. Interest centers this week in the pig iron purchase of the International Harvester Co., which bought 25,000 tons from the Tennessee-Republic company at an average price understood to be around $13 Birmingham. This transaction concludes the company's purchases for the present, although it is expected to enter the market again about the first of the year. The purchase of 5,000 tons of sheet bars this week for the independent sheet mill at Atlanta, Ind., insures the early operation of that plant and partial relief from the congested condition in the sheet trade. Ship building specifications were heavy last week, the American Ship Building Co. ordering 16,000 tons of plates and structural shapes from the Illinois Steel Co. for four of the boats for which it recently closed contracts. Altogether ten boats were ordered last week, the steel requirements of which will fall not far short of 40,000 tons. One thousand tons of steel will be required in the work of lowering the tunnels under the Chicago river, the contracts for which were awarded a few days ago, and 4,900 tons is involved in the building to be erected in St. Louis by Butler Bros. Iron and steel bars are moving freely, large western jobbers being among those negotiating for their year's requirements of the latter product. The United States Cast Iron Pipe & Foundry Co. was awarded a contract by the city of Chicago for 7,500 tons of 16 to 36-inch pipe, the Dimmick Pipe Co. receiving 1,000 tons. The Dayton (Ohio) requirements—1,500 tons—are to be readvertised.

Pig Iron.—The principal transaction last week was the purchase by the International Harvester Co. of 25,000 tons of southern iron from the Tennessee-Republic company. Silicon percentage was the basis on which the iron was bought, the specifications providing for 50 per cent, running from 2 to 2.50 per cent silicon, and 50 per cent calling for 2.50 to 3 per cent silicon. The price is understood to range between $12.90 and $13.15 Birmingham. Between three thousand and four thousand tons additional were bought from other southern furnaces to enable the company to obtain the mixtures it desires. It is noticeable this year that the company has bought very lightly of northern iron, practically all of the 50,000 tons which it has purchased since it became an active factor in the market having been placed with southern furnaces. The only conspicuous transactions with Ohio or local stacks involved 6,000 tons of standard Bessemer and about 10,000 tons of malleable Bessemer. Following this purchase the market has perceptibly strengthened. The minimum Birmingham price now is $13.50 for No. 2 foundry, and not a few furnaces have advanced their price to $13.75. The Sloss-Sheffield company has withdrawn from the market on Nos. 1 and 2 soft and foundry, and has only a limited quantity of Nos. 3 and 4 and gray forge to offer. Northern furnaces are also firmer, and while $18.25 Chicago for No. 2 foundry might be done in some places on desirable business, the general quotation is 25 cents higher than this figure. Lake Superior charcoal and malleable Bessemer are extremely firm at $19 and $18.50 respectively, with strong indications of an early advance in both. We have revised our prices, and quote as follows:

Lake Superior charcoal	$19.00
Northern Foundry No. 1	19.00 to 19.25
Northern Foundry No. 2	18.50 to 18.75
Northern Foundry No. 3	18.00 to 18.25
Northern Scotch Foundry	18.75 to 19.00
Ohio Strong Softeners No. 1	18.80
Ohio Strong Softeners No. 2	18.30
Southern Foundry No. 1	17.90 to 18.15
Southern Foundry No. 2	17.40 to 17.65
Southern Foundry No. 3	16.90 to 17.15
Southern Foundry No. 4	16.40 to 16.65
Southern No. 1 Soft	17.90 to 18.40
Southern No. 2 Soft	17.40 to 17.65
Southern Gray Forge	15.65 to 15.90
Southern Mottled	15.40 to 15.65
Southern Silveries (4 percent to 6 percent Silicon)	17.90 to 18.40
Jackson Co. Silveries, 8 to 10 percent Silicon	23.30
Alabama and Georgia Car Wheel	24.40 to 24.90
Malleable Bessemer	18.50 to 18.80
Standard Bessemer	19.10
Basic Iron	18.85

Billets.—The Atlanta (Ind.) sheet and tin plate mill, whose sheet bar wants were mentioned last week, has purchased 5,000 tons of sheet bars from the Republic-Tennessee interests. This is the only noteworthy transaction in intermediate steel products, the week's tonnage in billets and rods being made up of small lots. Prices are very firm, forging billets selling at $35 Chicago; wire rods, $36 Chicago, and sheet bars, $29 Pittsburg.

Iron and Steel Bars.—Large western jobbing interests are negotiating for their supply of steel bars during the coming year. Some good sized contracts already have been placed, but a still greater tonnage is pending. Contracts from consuming sources are also numerous, many firms placing supplementary orders. Specifications for steel bars are the heaviest they have been in years, in some instances being far beyond the capacity of mills to handle. There is also an improved demand for bar iron, though local

prices are said to be not as uniformly maintained as before. We quote mill prices, Chicago delivery, as follows:

Bar iron, 1.66½c; soft steel bars and bands, 1.66½c, half extras; soft steel angles, less than 3 x 3, 1.76½c; hoops, 2.06½c base, full extras; old rail stock, 1.65½c. Jobbers report a good demand from stock, with prices firm. We quote bar iron, 2.10c, full extras; soft steel rounds and squares, 3 inches and larger, $2 per 100 pounds base; flats, 2 inches to 4 inches by 1⅛ inch and larger, $2 per 100 pounds base; flats, 2 inches to 4 inches by 1⅛ inch and larger, $2 per 100 pounds base; flats, 4½ inches x 5 inches and 6 inches x 5-16 inch and thicker, $2 per 100 pounds base; all ovals, half rounds, $2 per 100 pounds base; steel bands, $1.85 to $1.95 half extras; soft steel hoops, $2.30 to $2.40 full extras. Other sizes not mentioned above, $1.85 per 100 pounds base, plus half extras.

Sheets.—No appreciable change is noted in the sheet situation. Prices are very firm, and owing to the shortage of sheet bars they may be advanced any day. The consumption of sheets is without diminution, and except from jobbers it is practically impossible to get deliveries of either black or galvanized within two to three months. Mill quotations, Chicago delivery, are as follows:

Nos. 8, 9 and 10, 1.96½c; Nos. 11 and 12, 2.01½c; Nos. 13 and 14, 2.06½c; Nos. 15 and 16, 2.16½c; box annealed; Nos. 18 and 20, 2.36½c; Nos. 22 and 24, 2.46½c; No. 26, 2.51½c; No. 27, 2.56½c; No. 28, 2.66½c; No. 29, 2.81½c; No. 30, 2.91½c. Jobbers' prices on less than carload lots from store are as follows: No. 10, 2.20c; No. 12, 2.25c; No. 14, 2.30c; No. 16, 2.40c; Nos. 18 and 20, 2.65c; Nos. 22 and 24, 2.70c; No. 26, 2.75c; No. 27, 2.80c; No. 28 2.85c; No. 30, 3.30c.

Galvanized sheets, mill shipments, are as follows: Nos. 10 and 11, 2.56½c to 2.61½c; Nos. 17 and 21, 2.91½c to 2.96½c; Nos. 22 and 24, 3.06½c to 3.11½c; Nos. 25 and 26, 3.26½c to 3.31½c; No. 27, 3.46½c to 3.51½c; No. 28, 3.71½c to 3.76½c; No. 29, 3.91½c to 3.96½c; No. 30, 4.16½c to 4.21½c. From store, prices on less than carload lots are as follows: Nos. 10 to 20, 3.10c to 3.20c; Nos. 22 and 24, 3.25c to 3.35c; No. 26, 3.45c to 3.55c; No. 27, 3.65c to 3.75c; No. 28, 3.85c to 3.95c; No. 30, 5.05c to 5.15c.

Plates.—The Illinois Steel Co. has received specifications from the American Shipbuilding Co. for the plates and structural shapes for the four new boats for which the latter company closed contracts last week. These requirements aggregate 16,000 tons, of which the plate tonnage amounts to nearly 7,000. Six other boats were ordered during the week, two going to the Toledo Shipbuilding Co., two to the Great Lakes Engineering Works, and two to the American Shipbuilding Co. The steel for none of these has been ordered, as yet. General demand for plates is strong, the difficulty in getting deliveries of universal sizes growing each week. The Carnegie Steel Co. has withdrawn from the market on this product. Prices are without change, mill shipments, Chicago delivery, being quoted as follows:

Tank steel, ¼-inch and heavier, up to 100 inches wide, 1.76½c base; flange steel, 1.86½c base; marine steel, 1.96½c base; all full extras. Plates 3-16 inch thick, $2 extra; gauges, 7 to 8, $3 extra; No. 9, $5 extra. Less than carload lots, $5 extra. We quote from local stocks; tank steel ¼ inch and heavier, up to 72 inches wide, 2c to 2.10c; 72 inches to 96 inches wide, 2.10c to 2.20c; 3-16 inch up to and including 60 inches wide, 2.10c to 2.20c; 3-16 inch 72 inches wide, 2.35c to 2.45c; No. 8, up to 60 inches wide, 2.15c to 2.25c; flange steel, 25c extra; heads, 25c extra.

Structural Steel.—The general contracts for the lowering of the three street car tunnels under the Chicago river have been let. Work is to be commenced immediately. The steel requirements amount to nearly 900 tons, the contract for supplying and fabricating which has not yet been let. The contract for the steel required in the building to be erected in St. Louis by Butler Brothers, has been awarded to the Jones & Laughlin Steel Co. This order calls for 4,900 tons. The local structural mill is running easy, and reasonably early deliveries of heavy beams and channels can be given. Prices are without change, mill shipments, Chicago delivery, being quoted as follows:

Beams and channels, 3 to 15 inches, inclusive, 1.86½c; angles, 3 to 6 inches, 1.86½c; angles, larger than 6 inches, on one or both legs, 1.96½c; beams, larger than 15 inches, 1.96½c; zees, 3 inches and over, 1.86½c; tees, 3 inches and over, 1.91½c, with the usual extras for cutting to exact lengths, punching, coping, bending, or other shop work.

Quotations on lots from store are as follows: All angles three inches and larger, including six inches, $2.25 per 100 pound base; angles over six inches, $2.35 per 100 pounds base; tees, three inches and larger, $2.30 per 100 pounds base; beams, three inches to fifteen inches, inclusive, $2.25 per 100 pounds base; beams, eighteen inches and larger, $2.35 per 100 pounds base; channels, three inches and larger, $2.25 per 100 pounds base.

Rails and Track Supplies.—There is a brisk demand for standard sections, but the impossibility of getting deliveries earlier than the fall of 1907 results in the withdrawal of much of this tonnage. Despite this fact from 10,000 to 15,000 tons were closed during the week under review. Track supplies continue to sell freely, and for delivery this year fancy prices are easily obtained. Our quotations are as follows:

Standard sections f. o. b. mill, open-hearth rails, $29; Bessemer, $28; light rails, Bessemer steel, 30 to 45-pound sections, $28.50; 25-pound, $29.50; 20-pound, $30.50; 16-pound, $31.50; 12-pound, $32.50, and lighter sections down to eight pounds, $29.50 to $41.50, all f. o. b. mill. Track supplies are quoted as follows: Angle bars, 1.50c to 1.75c; spikes (for quick shipment), 2.15c to 2.25c; for forward deliveries, 2c; track bolts (for quick shipment), 2.65c to 2.75c base; square nuts (for forward deliveries), 2.50c.

Merchant Steel.—New tonnage is light from the fact that the principal producers have withdrawn from the market. Specifications are exceedingly heavy. Prices are without change, mill shipments, Chicago delivery being quoted as follows:

Planished or smooth finished tire steel, 1.86½c; iron finish, up to 1½ x ½ inch, 1.81½c; iron finish, 1½ x 1½ inch and larger, 1.66½c, base; channels for solid rubber tires, ¾ to 1 inch, 2.16½c and 1⅛ inch and larger, 2.06½c; smooth finished machinery steel, 1.91½c; flat sleigh shoe, 1.71½c; concave and convex sleigh shoe, 1.96½c; cutter shoe, 2.35c; toe calk steel, 2.21½c; railway spring, 1.86½c; crucible tool steel, 6½c to 8c, and still higher prices are asked on special grades. Shafting, 50 per cent off in car lots and 45 per cent in less than car lots, in base territory.

Boiler Tubes.—No change is noted in the tube situation. Prices are better maintained than formerly and demand is of excellent proportions. We quote as follows:

	Steel	Iron	Seamless
1 to 1⅛ inches	46.35	43.35	53.35
1¼ to 2¼ inches	58.35	43.35	40.35
2½ inches	60.35	48.35	43.35
2¾ to 5 inches	68.35	55.35	
2¾ to 4½ inches (Seamless)			50.85
6 to 13 inches	58.35	43.35	

Less than carload lots, from store, as follows:

	Steel	Iron	Seamless Steel
1 to 1⅛ inches inclusive	40	35	42½
1¼ to 2¼ inches, inclusive	50	35	35
2½ inches, inclusive	52½	35	30
2¾ to 5 inches, inclusive	60	47½	42½

Merchant Pipe.—The low prices now being quoted are drawing out a good volume of business. Specifications are light from the manufacturing trade, but jobbers are stocking heavily in anticipa-

tion of a brisk demand after the crops are harvested. We quote on the base sizes, ¾ to 6-inch black steel pipe, 79.35 per cent discount, and 69.35 Chicago for galvanized. For material from stock jobbers are quoting 76 to 77 per cent on the base sizes, ¾ to 6-inch black steel pipe.

Cast Iron Pipe. — Contracts were awarded today by the city of Chicago for 8,500 tons of pipe. The United States Cast Iron Pipe & Foundry Co. secured 7,500 tons, all 16 and 36-inch pipe, and the Dimmick Pipe Co. the remainder. The Dayton (Ohio) contract for 1,500 tons of pipe was not let last week, but is to be readvertised. Prices continue firm, but without change. We quote, four-inch water pipe, $32.50; six and eight-inch pipe, $31; 10-inch and larger, $30; gas pipe, $1 extra.

Wire Products.—Despite the best efforts mills can make to supply the demands of their customers, shipments are falling further behind. The curtailment of output this summer resulted in an accumulation of orders and it will be some time before these are worked off. Stocks everywhere are low. The shortage of raw material is almost certain to result in an advance in prices before the fall trade commences. We continue quotations to jobbers without change, on mill shipments, Chicago delivery, as follows:

Wire nails, $2; painted barbed wire, $2.15; galvanized barbed wire, $2.45; smooth annealed wire, $1.85; smooth galvanized wire, $2.15; polished staples, $2.15; galvanized staples, $2.40. Carload lots to retailers, 5 cents higher than above prices; less than carload lots, 15 cents higher.

Coke.—New tonnage during the week was eminently satisfactory and widely distributed. The strength of pig iron is reflected in the increasing firmness of coke values, the absolute minimum of which is $5.40 Chicago for Connellsville 72-hour brands. For the better known makes, 10 cents a ton more is easily obtained. Solvay coke continues popular and strong at a minimum of $5.50 Chicago. Forty new furnaces are to be added to the South Chicago plant of the By-Products Coke Corporation, which will give the concern a total of 160 ovens when these are completed.

Old Material.—Interest in scrap is apathetic. Consumers are buying only such lots as may be offered at attractive prices, and because of the large tonnages most of them have on hand or under contract these are picked at will. Prices are weak. We have reduced heavy melting steel 50 cents a ton, and cast borings 25 cents a ton. The C., M. & St. P. list for 1,500 tons is the only new railroad offering this week. Our quotations are as follows, gross tons being mentioned in the first paragraph:

Old Steel Rails (4 feet and over)	$15.50 to 16 00
Old Steel Rails (less than 4 feet)	14.00 to 14 50
Old Car Wheels	18.00 to 18.25
Old Iron Rails	20 50 to 21.00
Relaying Rails, subject to inspection	27.00 to 27.50
Heavy Melting Steel	13.00 to 13.50
Mixed Country Steel	11.00 to 11.50

We quote net tons, as follows:

No. 1 R. R. Wrought	$13.50 to 13.75
No. 2 R. R. Wrought	12.50 to 12.75
Shafting	15.75 to 16.00
Dealers' Forge No. 1	11.25 to 11.50
Wrought Pipe and Flues	9.25 to 9.50
No. 1 Cast, 150 pounds and less	13.00 to 13.50
No 1 Mill	8 25 to 8.50
Mixed Busheling (No. 1 & No. 2)	8.50 to 9.00
Country Sheet	7.25 to 7.50
No. 1 Boilers Cut	9.00 to 9.50
Boiler Punchings	11.00 to 11.50
Iron Car Axles	22 50 to 23.00
Steel Car Axles	17.50 to 18.00
Iron Axle Turnings	9.25 to 9.50
Cast Borings	7.00 to 7.25
Mixed Borings, etc	7.00 to 7.50
Machine Shop Turnings	8.75 to 9.00
Railroad Malleable	12.50 to 13.00
Agricultural Malleable	12.50 to 13 00
Stove Plate and Light Cast Scrap	11.00 to 11.50
Old Iron Splice Bars	16.00 to 16.50

Big Contract for Ore.—The London *Iron and Coal Trades Review* states that the United States Steel Corporation has placed a contract, through a London concern, for the shipment of 250,000 tons of manganese ore. This contract is for Russian ore, and is the only one of any magnitude of its description placed for some twelve months past.

CLEVELAND.

Heavy Ore Movement.—Pig Iron Prices Advancing.—Finished Material Strong.

OFFICE OF *The Iron Trade Review*,
BROWNING BUILDING, July 24.

Iron Ore.—The movement of ore is now at its height with the situation entirely satisfactory, and July is certain to break the shipping record set by June. The scarcity of Bessemer and certain other grades of ore will doubtless have the effect of advancing the opening of buying for 1907 delivery; in fact, the anxiety over the supply for next year is already apparent in chance remarks dropped to sellers by consumers who expect to be taken care of. Contracts for new vessels placed during the past fortnight call for an aggregate tonnage of about 95,000 which will be available for the opening of navigation in 1907. Counting eighteen trips to the season, this addition to the ore fleet will have a season's capacity of close to 1,750,000 tons.

Pig Iron.—It is difficult to imagine a stronger situation than that prevailing in the local field. There is no Bessemer to be had and basic for the remainder of the year is practically exhausted. Furnaces running on foundry and malleable irons are so nearly sold up to their output for the balance of the year that salesmen have been called in and unsolicited business is being cared for as best it can. It is known that the requirements of a large number of consumers are not provided for up to the end of the year and there is more than the possibility of an iron famine during the fall. The past week has developed several inquiries for large tonnages of basic iron which have not been reported as filled. Spot foundry iron has been sold during the last few days at $17.50, Cleveland furnace, though for forward delivery $17.00 has been done. In the valley the price is apparently firm at $16.75 for No. 2. Ohio river furnaces, which had been shipping iron into this district, have advanced their quotation to $17.00 and southern furnaces are adhering generally to a price of $13.75 to $14.00. Malleable is strong at $17.00 in the valley with a good demand. The charcoal iron situation is thoroughly satisfactory, one northern interest reporting sales of over 40,000 tons in the last two months, deliveries extending through the year. Prices have advanced slightly and the demand is so heavy that a shortage is predicted before the year is out. A number of inquiries for delivery running into 1907 have recently developed. Coke is exceedingly scarce, prices being firm at $2.75 for furnace and $3.00 for foundry. We quote, Cleveland delivery, as follows:

Bessemer	$18.35 to 18.60
No. 1 Foundry	17.50 to 18.00
No. 2 Foundry	17.25 to 17.75
No. 3 Foundry	16.75 to 17.25
No. 2 Southern	17.60 to 17.85
Gray Forge	16.35 to 16.85
Gray Forge Southern	15 85 to 16 25
Lake Superior charcoal	19.50 to 20.00

Finished Materials.—The plate and structural shape market has been noticeably strengthened by the placing of orders for nine large ore freighters. Already, as a result, delivery on plates, which had become fairly prompt, has been set back from two to three months. It is understood that out of the requirements of ship builders for these vessels, the Carnegie Steel Co. received 20,000 tons through the local office. This was in addition to that given other interests and that given this company at other points, which was heavy. A brisk market in light rails is reported and prices for 20-pound sections and heavier have advanced to $30. Forging billets are easier and have sold locally as low as $32 within the last few days. Sheets are improved and a better tone prevails in other lines. The situation is apparently much stronger than a month ago. The city of Cleveland is receiving bids on 2,800 tons of cast iron pipe, running from three to thirty inches, and 120 tons of special castings. Bids will be closed at noon, July 30.

Old Material.—More activity is manifested in the local market. Mills are inquiring and a buying movement of some volume seems to be at hand. The

improvement, however, has not as yet been strong enough to affect prices. We quote, f. o. b. Cleveland, as follows:

Old iron rails	$20.00 to 21.00
Old steel rails (over 6 feet)	15.50 to 16.00
Old steel rails (under 6 feet)	16.00 to 16.50
Old car wheels	16.50 to 16.75
Steel boiler plate	12.00 to 13.00
Steel axles	19.00 to 20.00
Malleable iron (railroad)	15.00 to 15.50
Malleable iron (agricultural)	13.00 to 13.50
Heavy steel	15.00 to 15.50
Country mixed steel	13.00 to 13.50

We quote net tons as follows:

No. 1 R. R. wrought	15.50 to 16.00
No. 1 busheling	13.00 to 13.50
No. 1 machine cast	13.50 to 14.00
Iron axles	22.00 to 23.00
Axle turnings	10.50 to 11.00
Wrought turnings (free from cast)	9.00 to 9.50
Grate bars	10.00 to 10.50
Pipes and flues	11.50 to 12.00
Tank iron	10.50 to 11.00
Hoop and band iron	7.50 to 8.00
Sheet iron	6.50 to 7.00
Wrought drillings	9.00 to 9.50
Stove plate	10.00 to 10.50
Cast borings	7.00 to 7.50

Hardware Men on Tour.—Traveling as the guests of the American Steel & Wire Co., a party of eleven hardware men of Chicago and the southwest arrived in Duluth last week on the steamer Princeton. While there the plant of the Marshall-Wells Hardware Co., to which several large additions have been made lately, was visited.

CINCINNATI.

Market Considerably Stronger.—Some Producers Withdraw.

July 24, 1906.

Pig Iron.—The market is assuming a stronger tone under a firmer holding sentiment on the part of furnaces. Some of the important producers in the south have withdrawn from the market entirely and it is difficult now to purchase any southern brand at less than $13.50 Birmingham. During the week sales have been reported at $13.25 Birmingham, but late information is of a tenor to indicate that $13.50 is practically established. Southern producers are generally fairly well sold up for the next three months and the offerings of third quarter iron are limited. Southern Ohio furnaces are reported to be maintaining $16.50 at furnace for No. 2 foundry and malleable and some have advanced their price to $17.00. There are but few large inquiries pending but there are a number of small melters asking for prices covering their requirements for the third and fourth quarters. These inquiries are coming from belated buyers who did not cover on the break to $13.00 and are now contesting the advance and some are making firm offers of $13.25. Production in the south has been interfered with by the scarcity of labor and heavy rains have prevailed, which hampered the digging of ore.

The market appears to be developing a much stronger situation and producers both in the north and south who are in position to take on any more business are inclined to hold off in the belief that higher prices will be realized for the remainder of the iron they have to sell. This opinion is shared by the Virginia companies, which have advanced their quotations to $16.00 at furnace. We quote f. o. b. Cincinnati as follows:

Southern Foundry No. 1	$16.75 to 17.00
Southern Foundry No. 2	16.25 to 16.50
Southern Foundry No. 3	15.75 to 16.00
Southern Foundry No. 4	15.50 to 15.75
Southern Foundry No. 1, soft	16.75 to 17.00
Southern Foundry No. 2, soft	16.25 to 16.50
Gray Forge	14.75 to 15.00
Northern Foundry No. 1	18.15
Northern Foundry No. 2	17.65
Northern Foundry No. 3	17.15
Jackson County Silvery, 8 per cent	20.15 to 20.65
Southern Charcoal	24.00 to 25.00

Finished Material.—The market continues firm at unchanged prices. Bar iron is in fair demand and specifications on contracts are good for this season of the year. Plates are just steady.

We quote: bars at 1.63c, half extras, with dealers quoting 1.85c for iron and steel out of store. Galvanized sheets, No. 10 and No. 12, in car lots are 2.68c. We quote black sheets, No. 27 at 2.53c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.90c; No. 27, 2.70c; No. 16, 2.25c; No. 14, 2.15c; No. 12, 2.10c. Tank plates are firm and sell out of store at 2c to 2.10c for ¼-inch and 2.10c for 3-16, Nos. 8 and 10. Beams and channels are quoted at 2.25c to 2.35c from stock and angles at 2.10c to 2.15c for base sizes.

In merchant pipe the market is steady with a fair demand and quotations are unchanged. We quote f. o. b. Cincinnati.

MERCHANT PIPE.
(Basing Discounts)

	Steel Pipe		Guaranteed Wrought Iron Pipe	
	Black Per cent	Galv. Per cent	Black Per cent	Galv. Per cent
⅛ and ¼ inches	69.7	53.7	....	....
⅜ inch	73.5	61.3	....	....
½ inch	73.7	61.7	....	....
¾ to 6 inches	77.7	67.7	....	....
7 to 12 inches	72.7	57.7	....	....

Coke.—A firm tone prevails and prices show an advancing tendency. The cost of labor has been considerably increased and producers are holding at firm prices. The demand is fairly active. Prices in the leading coke producing districts are as follows:

Wise County, Va. Furnace Coke prompt shipment	$2.50 per ton
Wise County, Va. Foundry Coke on contracts	$2.75 to 3.00 per ton
Pocahontas Furnace Coke prompt shipment	$1.85 to 2.25 per ton
Pocahontas Foundry Coke on contracts	2.65 to 2.75 per ton
Connellsville Furnace Coke prompt shipment	2.50 to 2.85 per ton
Connellsville Foundry Coke on contracts	2.90 to 3.00 per ton
New River Foundry Coke on contracts	2.75 to 3.00 per ton
New River Furnace Coke, prompt shipment	2.25 to 2.50 per ton

†Wise County, Va., Coke on Furnace contracts is sold mainly on a sliding scale basis for pig iron prices on the following basis: $1.65 to $1.70 per ton on $9.00 pig iron, plus 17 percent of the advance on pig iron above $9.00 Birmingham.

Old Material.—The market continues dull and unchanged with an easy tone prevailing.

Old No. 1 railroad wrought, net tons	$14.00 to 14.50
Cast machine and foundry, net tons	12.50 to 13.00
Old iron rails, gross tons	20.00 to 20.50
Old steel rails, gross tons	15.50 to 16.00
Old short lengths, gross tons	16.00 to 17.00
Old iron axles, net tons	22.00 to 23.00
Heavy melting scrap, gross ton	15.00 to 15.50
Stove plate, net tons	10.00 to 10.50
Wrought turnings, net tons	9.00 to 9.50
Cast borings, net tons	7.00 to 7.50
Car wheels, net tons	16.00 to 16.50

PHILADELPHIA.

Pig Iron Market Stronger and Higher Prices are Expected.

July 24.

Pig Iron.—From the standpoint of the producers nothing could be more satisfactory than the present market. Orders, ranging from 25 to 2,000 tons, continue to pour in, mostly for the last quarter; prices rule very firm with an advancing tendency; production is more likely to decrease than to increase, and a bright future seems assured by the rosy reports of activity which come from the makers of finished material. These bullish factors are further strengthened by the great demand for coke, by the knowledge that there are still a number of belated buyers, whose purchases cannot be much longer delayed, and by the prospective closing for repairs within a short time of two or three important furnaces. Most local furnaces are now out of the market for the third quarter, and producers are beginning to talk about 1907. With the probability of a still further advance in the price of ore there is no disposition to make any concessions for the future, and prices rule astonishingly firm all along the line. During the past week basic has been in great demand at figures running close to $18, and a number of sales of No. 2X foundry are reported at $18.75. Pittsburg is said to have been buying in this market because of the scarcity of pig iron in that territory. While the tendency seems to be strongly toward a moderate advance in prices, furnace men show no disposition to take advantage of the needs of customers, and the change in figures from last week is not great. If the present activity continues there can hardly fail to be a general marking-up, but for the present prices may be quoted as follows:

No 1X Foundry	$19.00 to 19.25
No. 2X Foundry	18.60 to 18.85
No. 2 Plain	18.00 to 18.25
Standard Gray Forge	16.25 to 16.50
Basic	17.75 to 18.00
Low Phosphorus	24.75 to 25.00

Finished Material.—Numerous orders are reported in nearly every branch, structural material and plates leading in activity, as they have for a long time. Railroad orders are especially heavy, and with the assurance of

good crops this fall it is believed that their purchases in 1907 will make a new record. Bar iron continues to improve. Prices remain unchanged as follows:

Beams, channels and angles according to specifications, 1.83½c to 2c; refined iron bars, 1.63½c to 1.73½c; steel bars, 1.63½c to 1.73½c; plates, 1.73½c to 1.83½c.

Old Material.—The market has apparently touched bottom, and has started up again since the publication of the railway lists showing unexpectedly small amounts of scrap for sale. The buoyant tone in the pig iron and finished material markets has doubtless also had something to do with the past week's improvement, which is very noticeable in most lines. There has been considerable buying, and a better demand is expected in the near future. Prices may be quoted as follows:

Old steel rails	$16.75 to 17.25
No. 1 steel scrap	16.00 to 16.50
Old steel axles	18.50 to 19.00
Old iron axles	25.00 to 25.50
Old iron rails	19.50 to 20.00
Old car wheels	16.00 to 16.50
Choice scrap, R. R. No. 1 wrought	17.75 to 18.25
No. 1 yard scrap	16.00 to 16.50
Machinery scrap	15.50 to 16.00
Low phosphorus scrap	19.00 to 20.00
Wrought iron pipe	12.50 to 13.00
No. 1 forge fire scrap	12.75 to 13.25
No 2 forge fire scrap, ordinary	10.00 to 10.50
Wrought turnings	11.00 to 11.50
Axle turnings, heavy	12.00 to 12.50
Cast borings	9.25 to 9.75
Stove plates	11.50 to 12.00

NEW YORK.

Pig Iron Market Firm.—Prices Tending Upward.—Heavy Business in Steel and Rails Pending.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, No. 150 NASSAU ST., July 24.

Pig Iron.—Foundry iron has continued to sell freely during the week, especially the well known southern brands. This tonnage is however, not all to be distributed in the eastern district. Several of the furnaces have again withdrawn from the market temporarily and others have advanced quotations, which is equivalent to a notice that no more business is desired for the present.

Local business has again been confined to foundry grades; the sales of basic and Bessemer were so few and small as to be insignificant. A few large tonnages of eastern basic are under negotiation and are likely to assume the form of orders within a few days. There is still some spot basic available and prices have not yet been advanced. Southern No. 2 seems to be held firmly at $13.50 and some producers are even asking $14, Birmingham.

Ferro-manganese is again in active demand. Prices at tidewater now range between $85 and $90 for moderate sized lots. There was one sale of 2,000 tons for delivery during the present year and several of smaller tonnages.

The following are prices of pig iron at tidewater:

Northern No. 1 Foundry	$18.25 to 19.00
No. 2 Foundry	17.75 to 18.25
No. 2 Plain	17.50 to 18.00
No. 1 Southern Foundry	17.50 to 18.00
No. 2 Southern Foundry	17.00 to 17.50
No. 3 Southern Foundry	16.50 to 17.00
No. 4 Foundry	15.50 to 16.00

Certificates and Warrants.—Trading in pig iron certificates on the New York Produce Exchange continues to suffer from dullness and general apathy. Prices are only nominal, as the desire to buy or sell is practically nil. Traders look for no improvement until there is more metal in the yards. There were few offers during the week and no sales. The following are today's quotations for standard foundry iron warrants:

Standard Foundry Contracts.

	Bid.	Asked.
July	17.25	17.50
October	17.25	17.50
November	17.35	17.45
December	17.35	17.50

Finished Iron and Steel.—Although the volume of new business in both rails and shapes has been almost abnormally small, the total tonnage under negotiation continues to grow. All the offices of the structural steel makers are fairly smothered with inquiries calling for estimates. The American Bridge Co. reports an unusual number of inquiries for "light construction work," that is, steel work for mill buildings and industrial plants.

The contract for the steel for the Manhattan bridge has not yet been awarded. It now seems likely that the total requirement will be split up and divided among a number of mills. The New York Central railroad has let a contract for 1,000 tons more of bridge work to the McClintic-Marshall Construction Co. The same road will require 900 tons of bracket poles shortly and has a number of other structural contracts to place.

The plate market, although not particularly active, is in a fairly satisfactory state. Orders for ship plates continue to come in. Members of the Eastern Bar Iron Association last week at the monthly meeting reaffirmed the official quotation of $1.50

Old Materials.—Prices are still weak and irregular and it is apparently owing to a lack of pressure to sell that prevents a general sag to a lower level. Sellers show great confidence in the future and are not anxious to dispose of stocks. The only sales of note reported during the week involved 1,000 tons of strictly scrap rails, sold to a mill in eastern Pennsylvania. The following are prices approximately f. o. b. tidewater:

Old iron rails	$20.00 to 21.00
Old steel rails, long lengths	14.50 to 15.00
Old steel rails, short pieces	14.00 to 14.50
Relaying rails	24.00 to 25.00
Old car wheels	15.50 to 16.00
Old iron car axles	25.00 to 26.00
Old steel car axles	18.00 to 19.00
Heavy melting steel scrap	14.00 to 14.50
No. 1 railroad wrought scrap	16.00 to 16.50
Iron track scrap	14.50 to 15.00
Wrought pipe	12.50 to 13.50
Cast borings	9.50 to 10.00
Wrought turnings	13.00 to 13.50

ST. LOUIS.

Iron Sales Are Few But Prices Are Tending Higher.

July 23.

Pig Iron.—Only a small amount of iron is being contracted for in the local field, but the price remains firm with a tendency to advance. Thirteen fifty is the lowest quotation today with choice lots bringing $13.75 and even $14 for hurry-up delivery, whereas last week's odd lots could be picked up around $13.25.

The strength of the market in the absence of active buying is attributed more to confidence in the future than to any other cause, though the closing down of several southern furnaces has necessarily limited the supply. During the period when the market was grounded on the bottom, too, considerable business was booked which will keep the furnaces from suffering for some time on account of idleness.

Orders for the past week have been small, of the one, two and three carload variety, and for immediate delivery. In one or two instances some fancy prices have been paid for spot iron, the consumer being unable to wait until it could be shipped from the furnace. One Keokuk, Ia., house did not buy at the recent low level, believing that prices would go still lower and the result is that the house is buying at the top of the market

Southern No. 1	$17.50 to 18.00
Southern No. 2	17.00 to 17.50
Southern No. 3	16.50 to 17.00
Southern No. 4	16.25 to 16.75
Gray Forge	16.00 to 16.50

Coke.—Coke has been selling rather freely and the price has stiffened somewhat on account of labor troubles and the big demand for furnace coke. The price runs from $5.80 to $6.35 delivered in St. Louis, depending upon the grade. Inquiries for the last quarter improve.

Finished Material.—Since the adjustment of the labor troubles there has been more activity in the purchase of building materials, especially in the lighter grades. There would be still more demand if there were not a shortage of labor. The steel contract for the new railroad Y. M. C. A. building, about 400 tons, has been let to Nolker-Richards. The Christopher & Simpson Co. of St. Louis has secured the contract for the fabricating work on the Lemp Brewing Co.'s new building, which will require 500 tons.

BIRMINGHAM.

Production of Pig Will Soon be Increased.—Prices Higher.

Birmingham, Ala., July 23.—Even at an advanced quotation, Alabama pig iron manufacturers are still selling their product. In small lots it seems to be the favorite way for the consumers to make their purchases, though during the past week there were two or three good sized orders placed in this district. The production shows a little improvement over what it was a few weeks back and all efforts are being exerted looking to the completion of repairs on furnaces in different sections of the district. Iron shipments from the south are every bit as healthy as is the production. The railroads are furnishing all the cars necessary to handle the product promptly. Labor is still scarce around the furnaces. The announcement is made that the No. 4 furnace at Ensley (Tennessee Coal, Iron & Railroad Co.), is about completed and in the next week or two will be ready for the torch. This furnace has practically been rebuilt. The statement is made that the Tennessee company intends rebuilding all of the furnaces in the Ensley section. The Central Iron Co., the Lacey-Buck Co., the Tutweiler Co. and the Sloss-Sheffield Steel & Iron Co. will each have a furnace ready for operation by the first week in September. The Southern Steel Co. will blow in its furnace at Gadsden again about the middle of August. This furnace is being thoroughly repaired. The Alabama Consolidated Coal & Iron Co. has the contract to furnish the Southern Steel Co. basic iron until the middle of August.

The advance in iron prices announced during the past week was the outcome of a steady demand for the product of the furnaces. The Sloss-Sheffield Steel & Iron Co., according to statements made by high officials, never sold any iron under $13.50 per ton, No. 2 foundry. The advance of 25 cents did not put a stop to the demand for the product.

Metal Market

CHICAGO.

July 24.

Melters appear reluctant to buy owing to the marked flucuations in the market. Prices have strengthened in the past week, and in some instances have advanced. Lake copper is now quoted at 18½c to 18¾c; electrolytic, 18¼c to 18½c, and casting, 17¾c to 18c. Pig tin, car lots, 38c to 38½c; pig lead, desilverized, 6c to 6.10c for 50 ton lots; corroding, 6.50c to 6.55c for 50 ton lots; sheet zinc, $7.75 list f. o. b. LaSalle in car lots of 60-lb. casks; spelter, prompt delivery, 6.10c to 6.15c; Cookson's antimony, 27c; other grades, 25c to 26c; nickel, 47c for round lots, and 50c to 60c for smaller

On old metals we quote, copper wire, 16¾c; heavy copper, 16½c; copper bottoms, 16¼c; copper clips, 16c; red brass, 16c; red brass borings, 14¼c; yellow brass, 12¾c; yellow brass borings, 10¾c; light brass, 9¼c; lead pipe, 5¾c; zinc, 5c; pewter, No. 1, 24c.

NEW YORK.

July 23.

Pig Tin.—The demand from domestic consumers has been small and the market continues quiet.

The following are today's quotations. Spot, 36⅞ to 37.20; July, 36¾ to 37⅛; August, 36½ to 37; London, £169 10s and £169. Arrivals for the month to date, 2,378 tons; afloat, 1,792.

Copper. — The shipments abroad have been small and home consumption only moderate and the market continues to be dull. Today's quotations: Lake, 18⅜ to 18⅝; electrolytic, 18 to 18¼; casting, 17¾ to 18; London, £81 5s and £80 7s 6d. Exports for the month to date, 10,171.

Lead.—The demand has not revived and the market is dull. Today's closings, 5.75; St. Louis, 5.65; London, £16 11s 3d.

Spelter.—The local market for refined spelter continues quiet. Today's quotations: 5.95 to 6.05; St. Louis, 5.90. London, £27.

Antimony. — There has been no change either in conditions or prices. Today's quotations: Cookson's and Hallet's, 22½ to 23½c; other grades 21 to 22c.

ST. LOUIS.

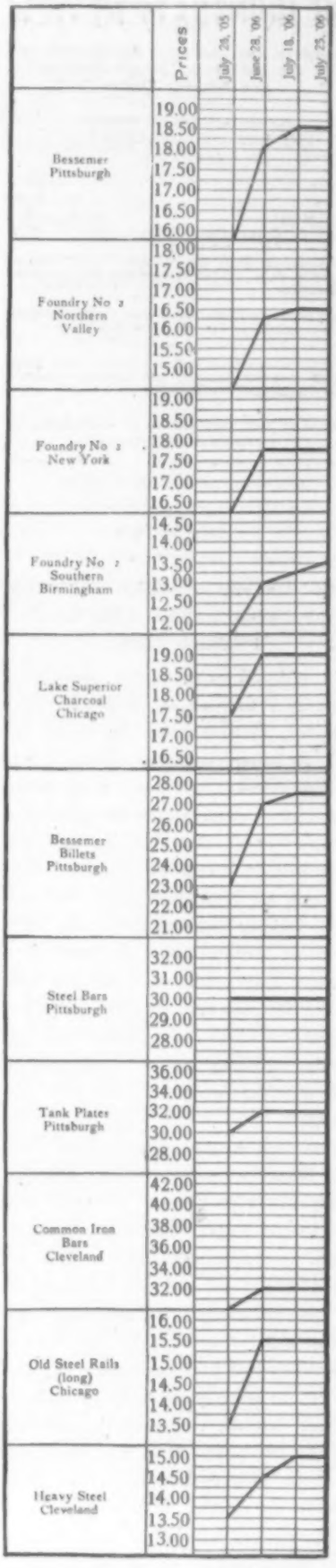
July 23.

There was considerable activity in the lead and zinc markets during the last week, both metals selling freely and showing substantial gains today. Fifty tons were sold at $5.65 Wednesday and one carload at $5.62½. The market then took a brace and 100 tons Thursday brought $5.67½, which is the quotation today, though 50 tons of chemical hard brought $5.75.

On the advance of zinc ore $1 a ton spelter has gone up in the local market. After the sale of 100 tons Wednesday at $5.87½ and 100 tons Thursday at $5.90 the market took up an upturn to $5.92½. All offerings were taken at that figure and more is wanted, but the metal is scarce. Six dollars was quoted today, but no sales reported.

Zinc ore sold as high as $48 on an assay basis of $41 to $45 per ton for 60 per cent zinc in the Joplin field. Lead ore closed the week firm at $75.50.

PRICE CHART.



THE IRON TRADE REVIEW

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July 26, 1906

THE GEOGRAPHICAL CENTER OF IRON, STEEL AND ORE PRODUCTION.

In addition to being the recognized business center of the iron and steel industry, Pittsburg can lay claim as well to being the geographical center of that industry, the exact point being near the western border of Allegheny county. This, however, is no new distinction; it has been one of the possessions of Pittsburg since iron and steel making first assumed any considerable proportions. A third of a century ago, when the total pig iron production of the country was but slightly in excess of 2,500,000 tons annually, Pennsylvania's contribution was considerably more than half that amount.

The New England States, New York and New Jersey were then comparatively heavy producers. As their proportionate output decreased Pennsylvania continued its advance and the rapid strides of pig iron manufacture in the Allegheny and Shenango districts, aided somewhat by the Mahoning valley just over the border in Ohio, served to keep it in front to such an extent that the center of the industry shifted but little. It is true there was a slight movement toward the west, due to the decline of iron production in the eastern half of the state through the displacement of native Pennsylvania ores by the Lake Superior ores which alone have made it possible for the state to maintain its supremacy. This movement, however, was slight; it was almost exactly in a westerly direction, the increased output of Alabama and Georgia being counterbalanced by the return of New York to the heavy producing class through the utilization of lake ores. But in the main it must be admitted that the fact of the geographic center of the industry remaining constantly in the Pittsburg district has been due to no other cause than the enormous output of that district itself. Its tonnage has been so tremendous that the important developments in Illinois, Alabama and Colorado have not been able to wrest away this distinction.

This position has been maintained by Pennsylvania notwithstanding the fact that the reason of its early supremacy, its leadership in iron ore mining, has been wiped away. As late as a quarter century ago the state was still the foremost ore producer and the geographic center of the ore industry was near the middle of its northern boundary. With the rapid development of the vast Superior deposits, however, this point has shifted in a northwesterly direction until the present overwhelming production of Minnesota has shifted it to a few miles west of Duluth, something near a thousand miles from its original location. As in the case of Pennsylvania with iron and steel, so it has been with Minnesota with ore,—its output has reached such gigantic proportions that the influence of outside producers is insufficient to draw the geographic center outside its confines.

From the foregoing it would appear that the ore seeks the fuel of the Connellsville coke region, but this is only an incidental feature. What the ore is really seeking is the market for the iron and its semi-finished products. The long established supremacy of the Pittsburg district in iron and steel making has resulted naturally in the creation of a vast consumptive demand in that section. Manufacturing plants have sprung up without number, their success has fostered others, and today the changed condition is presented of the production of pig iron and crude steel being held in that section by the very demand which the early furnaces and steel mills originated.

The manufacturing prominence of Pennsylvania will accordingly exert great influence in preventing the removal of the industry's center elsewhere, though developments at Gary, Ind., in the Ensley, Ala., district and in the west and northwest will necessarily work some important changes. As to the ore situation, the Superior district is certainly not yet at its zenith and until these rich fields are well worked out the geographical center of ore operations will not be materially shifted.

BASIC AND ACID STEEL.

There appears to be nothing left of the controversy as to the relative merits of acid and basic steel in the United States except to determine whether it died a natural or an unnatural death. That it is dead is pretty evident from the fact that last year this country made about seven times as much basic open-hearth steel as acid open-hearth steel, and made less acid open-hearth than in 1902, while basic open-hearth nearly doubled in that time.

There are times when the engineer can dictate processes and there are times when he must be satisfied with telling what he wants and getting it. In the steel business it is the latter case with him. The production of steel in the United States has practically doubled in six years, i. e., not until 1899 did we make ten million tons, while in 1905 we made twenty million, and steel manufacturers have had to be very busy to achieve these results. They have had to find fuel and ore in rapidly increasing quantities, utilize scrap where they could, build new plants, and push their old plants to outputs not hoped for when they were built. In all this work the steel manufacturer was striving for results, and he has felt all along that the engineer too, should be satisfied with results.

There can be no doubt that the acid and basic controversy in the United States was kept alive in considerable measure by a controversy waged abroad on what was really a totally different subject. Germany makes

steel by all four processes, acid and basic open-hearth and acid and basic Bessemer, but of that country's total Bessemer production in 1905 less than 10 per cent was made by the acid process, while in open-hearth the basic percentage was still less. The total Bessemer, again, was more than double the open-hearth. In England, on the other hand, the acid process slightly predominated in Bessemer, and to the ratio of nearly four to one in open-hearth steel. With one of these countries making a little more acid steel (by whatever process) than basic, and the other making basic steel almost altogether, it would be strange indeed if a quarrel should not arise. But more important than this has been the fact that the basic steel is made largely by the Bessemer process. Germany's production of basic Bessemer steel in 1905 was more than one and a half times that made by the other three processes combined, acid Bessemer and acid and basic open-hearth. The basic Bessemer process is almost infinitely less trustworthy than the basic open-hearth. Abroad, then, it was the basic Bessemer process which made the trouble, and it was simply called basic steel although there is, chemically, no steel with either a basic or an acid reaction.

In the United States there is no such thing as basic Bessemer steel. The ore deposits suitable for the process are so insignificant that after two or three abortive attempts they have been found incapable of supporting such an industry. If there is any controversy, it has to be directed against basic open-hearth steel because there is nothing else to oppose. Of acid Bessemer steel the United States has been prepared to make all that is desired, all its converter steel being of that description; of acid open-hearth it proposes to make but little, and has not materially increased its production of late years; the basic open-hearth is recognized as better for most purposes than acid Bessemer, and consumers will have to take it, being given reasonable guarantees as to chemical analysis or physical performance, or both, for that matter, if the two sets of requirements are made to bear the proper relations to each other.

So far as the mere terms basic and acid are concerned, the trend in the United States is indeed clearly from acid to basic, but merely as an incident to the change from the Bessemer to the open-hearth process, the Bessemer being acid, while the branch of the open-hearth industry which is growing is the basic.

In each of the past two years the make of Bessemer steel has exceeded that of open-hearth steel, by both processes, by less than two million tons; in the two preceding years the excess was about three million tons, and in the five preceding years, 1897-1901, the average was four million tons. At that rate of progress it will be but a very few years before the open-hearth process has overtaken the Bessemer, say by the time the new Indiana plant is in full operation.

Not until 1896 was the production of basic open-hearth steel segregated from that of acid open-hearth steel. The following table shows the change in alignment between the different processes in nine years, the Bessemer steel production in 1896, including a small tonnage made by the basic Bessemer process, while in 1905 the Bessemer steel was made entirely by the acid process:

Production, Gross Tons.

	1896.	1895.
Bessemer	3,919,906	10,941,375
Acid open-hearth	5,522,444	1,155,648
Basic open-hearth ...	776,256	7,815,728

INTERNATIONAL TRADE INCREASING.

It is interesting in itself that British iron and steel exports in the first half of 1906 were larger than in either half of 1905 and that they probably constitute a record for a six-month period, and that British imports in the first half of this year were also large, but the fact assumes more general importance taken in connection with other developments; that late advices from Germany are that that country is short of pig iron and instead of exporting pig iron largely to England, the Germans are actually importing large tonnages of pig iron from England, and that the United States in the twelve months just closed showed the largest iron and steel exports in her history, while imports were also large, larger at least than those of the preceding twelve months.

The fact is that the international channels of trade in iron and steel are loosening up. Of course there is a great deal of dumping of surplus product, but there is much more of an interchange. As manufacturers in one country become more familiar with the character of the products of other countries and more used to their methods of doing business, and as means of communication improve, all classes of iron material, raw, semi-finished and finished, show more of a disposition to cross international boundaries.

As recently noted in these columns, the iron and steel exports of the United States in the fiscal year ended June 30 last will be found to be in the neighborhood of 1,350,000 gross tons, or nearly a quarter of a million tons in excess of the best previous record. Imports will be found to be in the neighborhood of 500,000 tons, the record for several years barring the time of the American famine in 1902.

The recent British record is as follows, in gross tons:

	Imports.	Exports.
First half, 1905....	632,854	1,739,166
Second half, 1905..	731,438	1,971,605
First half, 1906....	721,199	2,107,435

These are probably record figures for the United Kingdom. Comparisons are not easily made as in earlier years the records were less full; at the present time the totals include pig iron, crude steel, and practically all the finished forms. To reduce them to pig iron equivalent would involve about the same percentage addition as would be required for the United States, where the totals also include pig iron, semi-finished and finished materials.

The time has passed in the United States when large exports spell adversity and imports spell famine. Our exports have been the largest on record during a period of unexampled demand at home, and our imports have been large because much semi-finished material comes in to be re-exported with benefit of drawback. In England it has been the same, barring the government bookkeeping on import duties, because there are none. Germany exports finished material all the time, and pig iron or crude steel when it can be spared; when there is a dearth of pig iron, as now, that country promptly becomes an importer of pig iron.

This freer interchange of commodities

is beneficial to all countries. A few years ago British steel makers were greatly wrought up over imports of German sheet bars and billets to South Wales and the Midlands, and fears were expressed that the British steel makers would suffer if something were not done. Last year the United Kingdom's output of crude steel was the largest on record, while the sheet and tin plate makers of South Wales and the Midlands are flourishing. In 1898 and 1899 the exports of tin plates averaged 253,000 gross tons and of sheets 232,000 gross tons, a total of 485,000 gross tons. In the first half of this year 177,288 gross tons of tin plates were exported, and 217,354 gross tons of sheets, a total of 395,000 gross tons, showing an increase of 63 per cent in the annual rate over the years 1898-9. The lesson is worth bearing in mind.

IRON ORE EXPLORATIONS.

Under the supervision of C. R. Van Hise, geologist of the United States Geological Survey, in charge of the section of pre-Cambrian and metamorphic geology, an economic investigation of iron ore deposits in Utah, Colorado, and the Lake Superior region will be conducted during the coming year. Mr. Van Hise will be assisted by C. K. Leith, F. C. Harder, F. Ward, A. C. Deming, and W. Toellner.

A detailed study of the iron ore deposits of the Hartville quadrangle in Wyoming will be made this summer by S. H. Ball. The Sunrise mine in this quadrangle is the greatest western iron ore producer. The ore deposits occur in the Whalen group of schists and limestones. Whether the ore occurs at a constant horizon and is repeated by folding and faulting, or whether it occurs at several horizons has never been definitely determined.

FACTORY COLONY PROGRESSES.

The Factory Colony Co., of Cincinnati, has been incorporated with a capitalization of $100,000 to deal in real estate. The incorporators are: F. A. Geier, N. H. Davis, Glen Brown, Louis N. Gatch and H. M. Levy. The object of this organization is to carry out the plans of a number of Cincinnati manufacturing concerns to relocate their plants on a 100-acre tract of land recently secured at Oakley, near that city. One of the companies interested, the Bickford Tool Co., has increased its capitalization from $100,000 to $200,000 to care for the establishment of the new plant.

MALLEABLE MEN MEET.

O. P. Letchworth is Host at Buffalo Gathering.—Tenth Anniversary.

Manufacturers of malleable iron and steel met in Buffalo Thursday and Friday of last week to celebrate the tenth anniversary of their organization as a social body. They met and banqueted in the same rooms in which they assembled ten years ago and the meeting was such an enjoyable event that its occurrence will be long remembered by the sixty or more who attended.

The malleable iron and steel foundrymen assemble once each year for an interchange of ideas, in an informal way, to acquaint themselves with their competitors and to learn their progressive ideas. They endeavor to make these

OGDEN P. LETCHWORTH.

gatherings full of enjoyment and the genial spirit prevails.

Ogden P. Letchworth, of the Pratt & Letchworth Co., did much to entertain his competitors at the Buffalo gathering. He was the gracious host at a banquet given Thursday evening at the Iroquois Hotel. The banquet hall was banked with flowers and the hotel's gold service was used. Orchestral music played during the repast and when it was concluded Mr. Letchworth's many guests were entertained with vocal selections. A number of the men were accompanied by their wives.

On the morning of July 20 the manufacturers were taken through the extensive plant of the Pratt & Letchworth Co. on Tonawanda street. This plant turns out malleable iron and steel castings, and is one of the largest of its kind in the country. Later the party was guided to special observation cars of the International Railway Co. and taken to Niagara Falls, where the delegates viewed the attractive features of the gorge and cataract. Reaching Lewiston, N. Y., Mr. Letchworth had dinner awaiting them. It was served in the open air on the banks of the Niagara. There, Mr. Letchworth, in kind words from his guests, was presented with a handsome Tiffany lamp. While it was intended to mark their esteem for their host, it was also meant as a token of respect for Mrs. Letchworth. It was most appropriately inscribed as follows:

"OGDEN P. LETCHWORTH,
FROM HIS COMPETITORS, JULY 20, 1906.
"HE'S A GOOD FELLOW."

Speeches full of earnestness, complimenting Mr. Letchworth upon his business successes and his good fellowship as well, were made by F. W. Sivyer of Milwaukee, president of the Northwestern Malleable Iron Co.; C. C. Smith of Pittsburg, president of the Union Steel Casting Co., John A. Penton, of Cleveland, president of the Penton Publishing Co., and W. H. Osborn, of Milwaukee, president of the Wisconsin Malleable Iron Co.

The Pratt & Letchworth Co. presented each woman in the party with a silk parasol.

ORE INTERESTS MERGE.

The incorporation of the Pittsburg Ore Co., of Hibbing, Minn., at St. Paul during the past week has brought to light a consolidation of considerable magnitude. As filed, the incorporators are: S. W. Croxton, S. H. Holding and P. H. Lonergan of Cleveland, and the capitalization is $6,000,000. The real significance is a consolidation of the interests of the Cherry Valley Iron Co. and the Rhodes Mining Co., the mining property concerned including the Brunt, Nassua and Croxton mines. The Rhodes Mining Co. formerly was sole owner of the Brunt and held a one-tenth interest in the Nassua. Now the control of all three mines comes virtually under the Rhodes Mining Co. through the new organization.

WILL DEVELOP ORE LANDS.

Negotiations for the purchase by the New York State Steel Co. of the southeast forty of the southwest quarter of section 23, 57-22, have been definitely broken off after it had seemed very likely that the sale would go through. The land in question is valued at $250,000 and is leased by the Central Steel & Iron Co. of Harrisburg, Pa. A railroad is to be built in to the property at once and it is to be developed by Jas. B. Bailey, president and manager of the Central Iron & Steel Co. Three forties on the same quarter now constitute the Mesaba Chief mine and the St. Paul is only a mile and a half away.

Progress of Campaign for the Open Shop.

W. J. Fairbairn, secretary of the Milwaukee Metal Trades and Founders' Association, has supplied THE IRON TRADE REVIEW with late figures concerning the molding industry of that city and with the appended table showing the steady progress made in operating the struck shops.

In Milwaukee there are 27 foundries making machinery castings. Of these two were only temporarily affected and are now running full, four signed the union agreement containing a clause calling for the same settlement as reached by the majority, and four others were working non-union men and have not been troubled. Thus, seventeen foundries were and still are affected by the strike. Of the 1,280 men normally employed in these seventeen shops 1,100 went on strike; of the 976 molders employed, 945 went out; and of the 304 coremakers employed, 155 joined the strikers. The following table eloquently tells the story of the determined and successful fight waged by these seventeen employers for the open shop:

SUMMARY OF CONDITIONS IN ALL THE 17 STRUCK SHOPS AT MILWAUKEE.

Week ending	Molders.	Core-makers.	Mach. Oper.	Hydmen & App.	No. of men at work.	Per cent normal output.	Per cent men working.
May 19	75	95	56	164	380	37	29
May 26	105	130	62	245	542	37	42
June 9	122	128	120	275	645	45	50
June 23	143	145	154	364	809	50	63
July 7	132	148	149	371	800	48	62
July 14	167	152	159	406	884	56	68

One of the large foundries in this district writes that when the molders walked out May 2 it was left with only a dozen apprentice boys. It set to work immediately to break in Italians, Poles and Greeks and is now running about 90 per cent of its output. "We consider the strike a blessing," writes the secretary, "and feel confident that the expense incurred will be offset quickly after we reach our usual output. We are now getting a day's work for a day's wage." Another concern says: "We are making progress with our work, notwithstanding we have had to break in green men in the foundry. We have no difficulty in getting all the handy men we want and occasionally pick up some molders. We have made molders out of the men who went on strike and we can turn out a second batch in time who will improve on the first ones. With our machines and our class of work, we do not require the skill that is needed in jobbing and machinery shops. We are turning out about 75 per cent of our normal capacity with about 80 per cent of the men's places filled. We do not anticipate there will be any change in the situation or that the men will return, as we have decided to run an open shop and will break in new men until we have the foundry filled, which will be before long."

Minneapolis and St. Paul.

There is little change in the strike situation in Minneapolis. Sixteen of the foundries have posted open shop notices and are in operation, more than 60 per cent of the normal output being secured. Molding machines are being installed wherever available. The Columbia Heights Foundry has signed the scale. The larger shops are running without much trouble and the smaller ones are buying castings outside, which with their present output enables them to keep up with their work. Three foundries at St. Paul signed the scale within the past fortnight. They are the Washington, Omaha and Columbia foundries. The American Hoist & Derrick Co. and the St. Paul Foundry have posted open shop notices and are operating with non-union men.

In the Buffalo District.

Eleven of the largest Buffalo foundries emphatically refuse recognition of the molders' union and to define their attitude have issued a statement which bears the signatures of one or more officers of each of the concerns. Copies of this statement have been posted in all the shops and sent to representatives of the union so that no misunderstanding of the foundrymen's position may occur. The employers have frankly made known their willingness to employ molders who struck May 2. These men, in many cases, have been re-engaged at higher wages than they were paid prior to the strike. The proprietors of the foundries insist that the men be dealt with individually and that no union representatives or committees interfere between the companies and the men. Officers of the union, they emphatically state, must stay away from the shops. Under these conditions many former members of the molders' union have been re-engaged.

Officers of the union are conducting their work quietly and no more trouble has been reported from any quarter this week. Men representing the union neither deny nor affirm the statements of the foundrymen and have little to say of the situation further than to give the color of encouragement to their side of the strike situation. The strike, however, continues to quiet down and most of the Buffalo and nearby firms report plenty of business and ability to execute orders with dispatch.

The statement issued jointly under date of July 17 by eleven local firms of the Buffalo Foundrymen's Association is as folows:

"We, the undersigned members of the Buffalo Foundrymen's Association, propose to operate the foundries hereafter strictly as open shops. Competent molders will receive fair treatment, good wages and steady employment, based wholly on merit and efficiency. No shop committees will be allowed to dominate our foundries; no restrictions of output will be tolerated. Worthy boys who desire to apprentice themselves to the molder's trade, without union restrictions, will be encouraged.

"If any of our desirable former employes, who left our employ at the time of the strike, May 2, 1906, wish to return, they can do so on the above conditions. We make this statement public and emphatic so that any of our loyal molders, with whom we have no dispute, will know exactly what to expect, if they care to work."

Fillmore Avenue Foundry & Iron Works, Lyman P. Hubbell, president.
Buffalo Scale Co., T. L. Richmond, treasurer.
Zero Valve & Brass Manufacturing Co., H. P. Bosworth, proprietor.
Farrar & Trefts, George M. Trefts.
East Buffalo Iron Works, George M. Trefts.
Buffalo Crucible Casting Co., E. G. Rippel, president.
Sherwood Manufacturing Co., H. S. Madden, president.
Howard Iron Works, R. W. Gardner, vice president.
Niagara Radiator Co., Charles F. Walther.
American District Steam Co., F. R. Dunn, superintendent.
United States Cast Iron Pipe & Foundry Co., George D. Hayes, resident manager.

The Columbus Situation.

Nine foundries at Columbus, O., members of the Columbus Foundrymen's Association, have issued an open-shop declaration over the signature of H. T. Hance, as follows:

"The undersigned, the Columbus Foundrymen's Association, proposes to operate its foundries hereafter strictly open shop. Competent molders will receive fair treatment, good wages and steady employment, based wholly on merit and efficiency. No shop committees will be allowed. No restriction on output will be tolerated. Worthy boys who desire to apprentice themselves to the molders' trade, without restriction, will be encouraged.

"As many of our desirable former employes who left our employ at the time of the strike, July 5, as it is practicable to employ may return to work under the above conditions and no other.

"We make this statement public and emphatic, so that any of our loyal molders with whom we have no dispute will know exactly what conditions to expect."

Structural Strike Ended.

The strike of the Housesmiths and Structural Iron Workers' Union, inaugurated some seven months ago

against the American Bridge Co., and the firm of Post & McCord, New York, was declared off at a mass meeting of the union held in New York, July 23. Three officials of Local No. 52, of this union, have been indicted by the New York grand jury on the charge of grand larceny. It is claimed that bogus certificates of membership to the union were issued and that amounts varying from $100 to $200 were obtained from various men who testified that after paying membership fees they found they were not recognized as members of the organization.

A. F. of L. Issues Platform.

The executive council of the American Federation of Labor has issued the following statement, relative to its oft-repeated declaration to "enter politics:"

"We recommend that central bodies and local unions proceed without delay by the election of delegates to meet in conference, or convention, to formulate plans to further the interests of this movement, and in accordance with the plan herein outlined at the proper time and in the proper manner nominate candidates who will unquestionably stand for the enactment into law of labor and progressive measures.

"The first concern of all should be the positive defeat of those who have been hostile or indifferent to the just demands of labor. Wherever both parties ignore labor's legislative demands a straight labor candidate should be nominated, so that honest men may have the opportunity of exercising their franchise to vote according to their conscience instead of being compelled either to refrain from voting or to vote for the candidate and the party they must in their innermost souls despise."

ELECTRICAL CONTRACTORS MEET.

The National Electrical Contractors' Association held its sixth annual convention at the Hollenden hotel, Cleveland, last week. The convention decided to co-operate with the Winona Trade School, of Indianapolis, adopted a set of uniform symbols to be used in marking electrical wiring plans, and selected a committee to investigate the possibilitity of preparing uniform specifications and contracts for electrical work. The next convention will be held in New York City in July, 1907. The following officers were re-elected: James T. Strong, New York, president; W. I. Gray, Minneapolis, first vice president; Walter C. McIntire, Philadelphia, second vice president; F. E. Newbery, St. Louis, third vice president; John R. Galloway, Washington, treasurer; W. H. Morton, Utica, N. Y., secretary; J. C. Sterns, Buffalo, sergeant-at- arms.

The balance sheet of the Krupp plants at Essen, Germany, shows that on July 1, there were 5,065 superintendents and 62,553 workmen employed, an increase of 7,000 in one month. In the steel works alone 36,000 men are employed. The average wage is about $1.40 for a nine hour day.

OLD RANGES

HAVE THEIR SHARE OF NEW DEVELOPMENT WORK.

Two New Shippers on the Menominee.—Serious Washout at the Florence.—Champion Resumes.

Ironwood, Mich., July 24.—The Traders mine, operated by the Antoine Ore Co., in which the Republic Iron & Steel Co., the Shenango Steel Co. and Oglebay, Norton & Co. are interested, is making the largest output in its history. The mine, a big open pit proposition, recovering its product through the milling system, is located in section 17, 40-30, at the outskirts of Iron mountain, Menominee range. Its ore is of low grade, running about 41 per cent iron and carrying upwards of 35 per cent silica, but it is cheaply mined. The ore bodies are large, extensively opened up and developed on practical lines with openings extending as much as 400 feet or more in lateral length. Scarcely any timber is required. The ore is milled to the tram cars from the open pit, and after being hoisted through the shaft house passes through crushers before being run into the cars conveying the product to the Escanaba docks. The mine is in good physical condition, with big possibilities ahead. Work will be commenced within a few weeks on a new shaft which is to be sunk south of the present one. A force of 150 men is employed, and day and night shifts are being worked. Most of the men are now accommodated at a large boarding house recently erected by the company. E. W. Hopkins, of Commonwealth, general manager of the properties of Oglebay, Norton & Co., on the Menominee range, has supervision of the work at the Traders.

The Mineral Mining Co., a Wisconsin corporation controlled by the same interests which predominate in the Pewabic Co., operating the big Pewabic mine at Iron mountain, is shipping from six to seven car loads of ore daily from the old Breen mine, at Waucedah, Menominee range. The property is operated on a small scale, only about twenty men being employed. The Breen mine was discovered in 1872, and holds the distinction of being the first property to be opened on the range. Up to last season, when the Mineral people took over the tract, the mine had been idle many years; in fact, except for some work carried on there in 1875 and 1877, it had been inactive since its opening. The ore runs only about 40 per cent iron, but with the product won on the open pit and milling method the mine is operated cheaply and economically. Nothing has yet been mined below a depth of 100 feet, and the property is good for an output of 50,000 to 100,000 tons per annum without crowding. It is reported that two new shafts will be sunk during the coming year, and some important additions made to the hoisting plant. Some stripping is in progress at the No. 1 pit under contract.

In the Iron River-Stambaugh District.

The Mineral company is particularly active in the Iron river-Stambaugh district, at the opposite or western end of the Menominee range. It is operating the Naniamo mine, embracing what was formerly the Beta property, and it holds an extensive acreage elsewhere in the field. The company has in hand considerable exploratory work. Drills operated by it on the Konwinski property are understood to have tapped considerable ore bodies, and important discoveries are anticipated at the old Sheridan mine, at Iron river, which the company is now giving attention. The Naniamo was one of the first properties to be opened in the district, although it had never been extensively opened. It was taken over by the Mineral company in 1903, previous to which it had been idle two or three years. The mine looks very well now. The ore bodies developed are substantial and continuous, and apparently are good for many years to come. The mine is opened to the fourth level, down 400 feet, and the showing in the bottom is as good as in any of the workings. A modification of the sub-level caving method is used in winning the ore, and it works admirably without the use of timber. The annual consumption of timber thus becomes nominal, which is a remarkable feature and means much to the company.

At the Florence mine, Menominee range, a serious washout occurred a week ago in consequence of a hard rain, a veritable cloudburst, the heaviest downpour experienced in that district in many years. An avalanche of sand and water poured from a big open pit into No. 4 shaft, breaking through at about the third level, the accident occurring just a moment after a skip-load of eight miners had descended. The skip was caught and almost submerged, imperiling the lives of the miners. It took considerable time to extricate the skip, and the occupants were rescued little the worse for their experience with the exception of one man, who was found on the fourth level, whence he had fallen. Mining was suspended for several days in this portion of the mine in consequence of the unexpected inundation, it being necessary to shovel the sand into the skips and send it to surface before ore hoisting could be resumed.

It is rumored that a deal is on whereby the Monro mine, a property at Norway, Menominee range, will together with a number of Mesabi range mines be

taken over by a new corporation in which Alexis Thompson, formerly president of the Republic Iron & Steel Co., is interested. Nothing authentic can be learned at this end concerning the reported transaction, although the Monro was looked over recently by a party of eastern steel mill men. The Monro is a property of the Buffalo & Susquehanna Co., producing a hard hematite ore, and is operated on the milling system.

New Menominee Shippers.

New shippers this season from the Menominee range are the Fairbanks mine, in the Crystal Falls district, and the Saginaw, at Norway. Both of these properties were first opened years ago, the Fairbanks in 1882, closing one year later after shipping a total of 8,500 tons of ore. The work done at that time was merely a surface scratch, affording no basis for judging the real worth of the property. The Fairbanks adjoins the Great Western mine of Corrigan, McKinney & Co., and is now being reopened and developed by that concern. The extent of the ore body is something that is yet to be ascertained, but in any event the mine will make a fair-sized output for a new proposition this season. The Saginaw is being reopened by John T. Jones, of Iron Mountain, who is also developing the Empire property, several miles south of Negaunee, Marquette range. The Saginaw was formerly the old Perkins, lying just west of the Briar Hill mine of the Penn Mining Co., and was a profitable producer in the first decade of Menominee range mining. It was opened in 1879, and suspended operations in 1890, with a record of approximately 400,000 tons. The limestone in the foot and the jasper in the hanging came together at a depth of about 400 feet, and cut out the ore entirely. A diamond drill was put to work, but without locating new deposits, and the property reverted to the fee owner, John Perkins, of Norway. Capt. Perkins was by no means satisfied that the mine was exhausted, and two or three years ago began exploratory work from the former openings with entirely satisfactory results, running into a new body of fine blue ore. This deposit proved of considerable extent, and Mr. Jones took over the mine, further opening the new body and using a diamond drill with such excellent results that the deposits now known to exist will keep the company busy mining for years to come.

The Steel Corporation's Champion mine, at Beacon, western Marquette range, which recently resumed work after having been idle since two years ago last October, is now hoisting 325 tons of ore a day, a production which will be materially increased as soon as additional miners can be secured. The force now numbers 175 men, and, if they can be had, 150 more will be given work. The Champion will ship about 80,000 tons this season. Two million tons will be the outgo from the Hull mine, one of the company's Mesabi range giants. Extensive stripping work is in progress here and it is expected the Hull will forward 3,000,000 tons in 1907, rivaling the Steel Corporation's great Mountain Iron mine, which it is anticipated will achieve that stupendous record this year. The Hull is mining from both shafts and open pit.

The American mine, a long abandoned property on the western Marquette range, has been pumped out by M. A. Hanna & Co., and has resumed mining operations this week. A force of forty men is employed, and that many more miners are wanted. The American was never fully explored or developed, and it is estimated that sufficient ore will be opened into to insure for the property an active career for several years at least. From its Yates mine, on the Mesabi, the firm will ship approximately 400,000 tons this season, and from the Alexandria about 160,000 tons.

OBITUARY.

Theodore F. Patterson, for six years in charge of the Montour mills of the Reading Iron Co., Danville, Pa., died July 15 at Valley Forge, Va., at the age of 62.

Charles C. Miller, for many years connected with the Westinghouse Air Brake Co., Pittsburg, and later treasurer of the Peerless Rubber Co., died at his home in Bath avenue, Long Branch, N. J., on July 17, of paralysis.

John W. Robinson, founder of what is now the Virginia Iron, Coal & Coke Co., died July 16 at his home at Graham Forge, Va., at the age of 67. He was for many years secretary and treasurer of the Reed Island Iron Co., Reed Island, Va.

John Evans, for 15 years foreman of the Brier Hill Iron & Coal Co., was instantly killed July 19 as the result of a blow pipe bursting at the plant. Another workman was injured so badly that he died after a few hours. Mr. Evans was for one year superintendent of a furnace at Duluth.

Henry Klein, superintendent of the Tudor mill of the Republic Iron & Steel Co., East St. Louis, Ill., died recently at his home in Youngstown, O. For more than 15 years Mr. Klein was employed as puddle boss at the old mill of Andrews Bros. & Co. in Haselton, and when that mill was abandoned he went to the Valley plant in Youngstown as superintendent.

SEEKING IMMIGRANTS.

Canadian Manufacturers Will Open Office in England.

(Special Correspondence.)

Toronto, Can., July 23.—The report of the Canadian department of trade and commerce for April shows a considerable increase in the imports of iron and steel manufactures, as compared with the corresponding month of 1905. The total imports were valued at $5,211,141 as against $4,353,105 for April of last year, the imports from the United States being $4,296,400, as compared with $3,590,722. The most considerable increase was in machines and machinery. The figures being $859,673 for the total imports, of which $805,364 were from the United States, as against $608,950, total imports and $568,432 American imports for April, 1905.

The executive committee of the Canadian Manufacturers' Association July 19, appointed a sub-committee to perfect a plan for opening an office in England to procure the emigration of skilled mechanics to Canada, where employment will be secured for them in the factories. A resolution was also passed asking the Canadian government to permit the importation, duty free, of denatured alcohol for industrial uses. It was determined to urge upon the government the payment of a bounty on the tonnage of steamships launched in Canada and to request that in the purchase of supplies for public works the government should take into consideration the full amount of the duty upon such articles.

The Toronto Railway Co. has decided to order no more steel rails in England on account of the delay involved, often amounting to several months, as the English manufacturers ordinarily make a different type of rails for home use. They will hereafter place their contracts in the United States.

The town of Port Hope, Ont., has voted in favor of giving the Central Foundry Co. exemption from taxes for ten years. The company, which represents American capital, will begin at once to manufacture cast iron pipe and cast thread fittings. It agrees to employ not less than 50 men and pay at least $25,000 in wages per annum.

The Belleville rolling mills, of which Wm. Eppelsheimer, formerly of Montreal, is general manager, is disposing of the nail plant in connection with the works and will install machinery for the manufacture of horseshoes.

The Brantford Screw Co., Ltd., has been authorized to increase its preferred stock from $50,000 to $100,000.

PERSONALS.

H. Van Atta has retired from the superintendency of the J. L. Mott Iron Works.

W. H. Chadbourn Jr., of Weaver, Pa., has been appointed chief engineer of the Chicago Great Western railway.

J. A. Lord, formerly a government expert, has taken charge of the bureau of statistics conducted by the Pittsburg Chamber of Commerce.

Henry Phipps, of Pittsburg, Pa., according to newspaper reports, has rented Glen Quoich, a famous deer forest of 50,000 acres in Scotland.

George H. Crosby, of Duluth, well known in both iron and copper mining circles, left July 22 for Montana and Idaho, where he will visit the Copper Queen mine.

J. M. Boutwell, assistant geologist of the United States geological survey, will take charge of the collection of statistics on lead, zinc and quicksilver after Jan. 1, 1907.

H. C. Ebbert, president of the Cincinnati Car Co., was recently injured in a painful manner while autoing. He was struck on the head by a stone thrown by a farmer.

E. H. Sniffen, vice president of the Westinghouse Machine Co., accompanied by Mrs. Sniffen, sailed last week on the steamer Minneapolis for a two months' stay in Europe.

W. W. Shilling, of Sharon, Pa., has been elected president of the Sharon Foundry Co., with Thomas Kennedy, secretary and treasurer. The old board of directors has been re-elected.

Charles W. Lutz is the new superintendent of the Rankin, Pa., plant of the American Steel & Wire Co. Mr. Lutz succeeds August Mann, who has taken charge of the Donora plant.

Arnold K. Reese has been selected as general manager of the Dowlais Works at Cardiff, South Wales, of Guest, Keen & Nettleford, Ltd. He will take complete charge of the works.

James P. Roe, superintendent of the Glasgow Iron Co., Pottstown, Pa., and Joseph Hartshorne, metallurgical expert for that company, are in Europe where they will remain about two months.

S. F. Emmons, geologist of the United States Geological Survey, will personally supervise investigations during the summer in the various mining regions of the west, particularly about Butte, Mont.

S. F. Forbes, formerly purchasing agent for the Chicago Rock Island & Pacific railway, has been appointed purchasing agent of Fairbanks, Morse & Co., Chicago, succeeding in this capacity C. A. Piercy.

Louis G. Jenks has been promoted to the superintendency of the Republic Iron & Steel Co.'s mines at Virginia and Sparta, and his jurisdiction will extend over the Franklin, Victoria, Bessemer, Union and Pettit mines.

L. E. Dunham, formerly superintendent of the Ashland Iron & Steel Co., and connected with the ore department of M. A. Hanna & Co., was in Duluth, July 16, leaving the next day on his way to visit the company's interests on the Mesabi.

Galitizan Reilly, for five years chief shipper of the Youngstown Sheet & Tube Co., has accepted a position as inspector at the works of Spang-Chalfant in Pittsburg. Mr. Reilly is a brother of W. C. Reilly, general manager of the Youngstown plant.

W. F. Barnes, senior partner in the W. F. & John Barnes Co., Rockford, Ill., has sold his interest to Harold I. Pratt, of Brooklyn. The latter is a son-in-law of John Barnes, who will retain his interest and continue as managing head of the company.

A. C. Morse, superintendent of the Shelby Steel Tube Co., Shelby, O., has tendered his resignation, effective Aug. 1, and will accept service with the Seamless Tube Co. of America, at Monessen, Pa. Mr. Morse has been with the Shelby Co. since its organization fifteen years ago.

Harry R. Urban, who has been connected with the Riverside department of the National Tube Co., has resigned to take service with the Tennessee-Republic interests where he will be associated with Frank H. Crockard, former superintendent at the Riverside plant.

F. N. Hoffstot, president of the Pressed Steel Car Co., sailed last week for a three months' stay in Europe. A recent business trip to the west, he stated on the eve of his departure, convinced him that the demand for cars during the next three months would be greater than heretofore.

W. B. Pearson and E. B. Caldwell, president and Detroit representative of the Standard Screw Co., have opened an office in the Penobscot building, Detroit, under the name of E. B. Caldwell & Co., for the purpose of underwriting bonds of industrial enterprises. A New York office is also maintained.

Harry W. Champion has been elected president, William M. Graham, treasurer, and Ellis J. Hannum, secretary of the Newton Machine Tool Works, Inc., Philadelphia. This election was occasioned by the death of Charles C. Newton, founder and president of the company, with whom the officers-elect have been closely associated for many years.

Z. W. Davis, formerly with the Davis Coal & Coke Co., of Chicago, has assumed charge of the coal and coke sales department of DeCamp Brothers & Yule, of St. Louis.

H. R. Barnhurst has been made assistant general manager of the Wilkins-Challoner Co., machine manufacturer of Oshkosh, Wis. Mr. Barnhurst has been general manager of the Stearns Mfg. Co., Erie, Pa., and previous to that was superintendent of the Erie City Iron Works. He was also connected for a time with the West Allis plant of the Allis-Chalmers Co.

Arthur W. Taylor, who has been in charge of the chemical laboratory of the Otis Steel Co., Cleveland, has resigned to accept the position of assistant superintendent of the open-hearth department of the Colorado Fuel & Iron Co., Pueblo. Mr. Taylor is a graduate of the Ohio State University and has been with the Otis Steel Co. ten years.

T. S. Clark, formerly with the Sharon Steel Hoop Co., Sharon, Pa., has been elected president of the Perry Iron Co., which is to erect a furnace at Erie, Pa. E. H. Williams, for many years in the employ of Pickands, Mather & Co., will be general manager. The furnace will be of 300 tons capacity, and switching connections are already being installed.

At a recent meeting of directors of the Bethlehem Steel Corporation resignations were tendered by Edward McIlvain and Adolph E. Borie, first and second vice presidents, respectively. They were succeeded by Archibald Johnston and Henry S. Snyder, the latter having been secretary and treasurer. He was succeeded by J. A. McGregor, and B. H. Jones was elected assistant secretary.

W. H. Johnson, formerly assistant traffic manager of the Republic Iron & Steel Co., has been appointed assistant traffic manager of the Tennessee-Republic Co. and Birmingham Southern railroad, under W. H. Moore, traffic manager, whose headquarters are in Pittsburg. Mr. Johnson will have headquarters in the Tennessee company quarters and will report to Mr. Moore. The latter will make frequent visits to the Birmingham district.

A Pennsylvania charter has been granted to the Henry, Millard & Henry Co., which concern will manufacture gas and gasoline engines at Eberton, York county, Pa. Charles T. Henry, J. Brooks Millard and Joseph T. Henry, York, are the incorporators.

GAS BLOWING ENGINE PLANT OF THE INDIANA STEEL CO.

What will eventually develop into perhaps the largest gas power plant in the world has its inception in an important contract recently placed with the Westinghouse Machine Co., of East Pittsburg, for eight large gas driven blowing engines to be installed in the steel plant at Gary, Indiana. As it is the expressed intention of the United States Steel Corporation, which controls the Indiana Steel Co., to make this the foremost American steel center, the significance of the simultaneous development of gas power is obvious.

The machines comprised in this initial order will be uniform in size and used for blowing purposes but also for electrical generation. In all sizes, a resemblance to the horizontal, tandem, heavy duty steam engine design is strong. The general design conforms quite closely to that of similar machinery ordered by the Steel Corporation for the Carnegie Steel Co.'s plant at Bessemer, near Pittsburg. It also follows closely, but upon a larger scale, the design of a number of smaller units already in operation in various parts of the country for power work; notably those at the plants of the Warren & Jamestown Street Railway Co., Warren, Pa., Standard Steel Car Co., Butler, Pa., Iola Portland Cement Co., Iola, Kan., Carnegie Technical Schools, Pittsburg, etc. Some of these smaller plants are operating on natural gas, but with the exception of slightly different proportioning of the air and gas passages and cylinder diameter, the general construction of the natural gas engine is practically identical with that intended for leaner gases, such as producer and blast furnace gases.

For several months a 350 horsepower engine of this type has been in regular operation on blast furnace gas at the Edgar Thomson Works, Pittsburg, generating electricity for motor-driven foundry machinery. The engine was installed largely for experimental purposes and has given such excellent operating results that the success of the larger machines may be regarded as an assured fact. At the present time this engine is completing a 30-day continuous load and duty test, operating 24 hours per day and seven days per week during the period.

The following description may be taken as representative of the general type used for blast furnace, producer, or natural gases, although it refers more particularly to the various plants already installed. The illustrations presented herewith are mainly of engines already installed in various plants, but contain the typical features of the engines to be installed at Gary.

The Gas Engine.—General Description.

The engine operates upon the familiar Beau de Rochas or four stroke cycle with a practically constant quality of mixture. With the tandem cylinder arrangement one power impulse is obtained on each forward and backward stroke, the resulting crank effort being equivalent to that of a single cylinder double acting steam engine.

Early in their experience with horizontal gas engines the builders became convinced of the absolute necessity of accessible parts. Later experience has proved this point. In comparison with the benefits to be derived from having all parts of the engine above the floor level, the increased cost in foundations is immaterial.

To be a success the modern prime mover must be as near "fool-proof" as possible, and the designer is forced to contend with the possibilities of cheap labor. Auxiliaries capable of automatic working have, therefore, proved to be extremely desirable. The continuance of the cooling water sup-

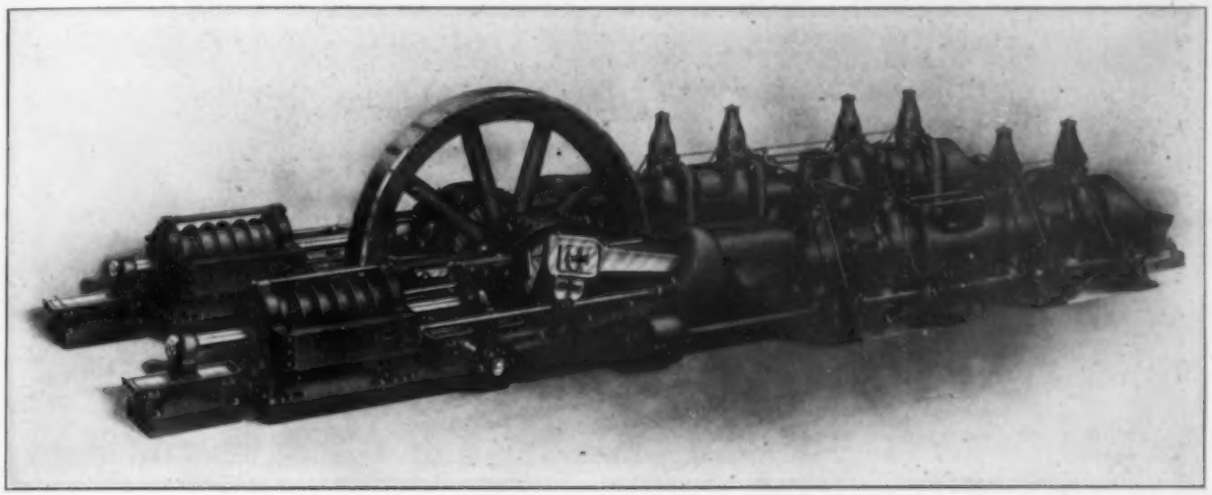

FIG. I.—GENERAL ARRANGEMENT OF 3,000 HORSEPOWER TWIN-TANDEM GAS BLOWING UNIT, AS INSTALLED BY CARNEGIE STEEL CO. AND THE INDIANA STEEL CO.

capacity. Each gas engine, as an electric unit, will have a rated capacity on blast furnace gas of nearly 3,000 horsepower, corresponding to a rating of 4,000 horsepower on natural gas. The unit will be arranged in twin tandem fashion, each side consisting of two double-acting gas cylinders and one blowing cylinder in the opposed or "vis a vis" arrangement. The power cylinders are forty-two inches, and the air cylinders sixty-eight inches in diameter with a common stroke of fifty-four inches, the unit running at a maximum speed of 75 revolutions per minute for blowing and 84 revolutions per minute for electric work. The capacity of air delivery at this speed will be 33,000 cubic feet of free air per minute at 18 pounds per square inch pressure, with a maximum delivery pressure of 30 pounds per square inch.

This type of engine will not only be

ply or lubrication should not be dependent upon the caprice of an indolent attendant, as the possibilities of danger are too great.

In order to suit the present American market and the labor conditions existing here, it has been a special endeavor of the builders to simplify the construction and operation of gas engines to the greatest possible degree compatible with the economy desired. It would obviously be poor engineering to retain complicated and expensive construction where the last degree of economy was not desired. The first and most important problem is to build an engine that runs well. Refinements calculated to secure fine haired economies can then be applied when desired.

Frame and Cylinder Arrangement.

It will be observed from the accompanying photographs that the cylinders are supported quite clear from the foundation by main, center, and rear frames respectively. Only the main frame is anchored; the others rest upon sliding ways to accommodate expansion and contraction of the engine body. To insure permanence of alignment, the cylinder ends are recessed into their respective frames.

Side crank construction has become the standard practice of the builders. A heavy box girder bed, cast in one piece, provides a rigid supporting structure for the main bearing with a generous distribution of metal in a continuous rectangular member surrounding the crank pit. The rigidity of the center crank construction is thus retained, at the same time decreasing the cost of machine work and up-keep. For access to the center crosshead, the middle housing has the upper front quadrant cut away, the opening being closed by a heavy tie rod. All guides are bored.

Crankshaft.

The crankshaft is of solid forged steel, with a cast steel disc pressed on with a taper fit. On account of the large diameter of the shaft the crank pin is cast integral with the disc, special precautions being taken to insure homogeneous metal by casting under pressure head.

Bearings.

The bearings are of segmental construction with a bearing cover locking over upright guides to secure greater strength. The main bearing is in three parts, the lower shell resting in a bored seat. The shell may be readily removed from above by jacking up the shaft. They are cored for water cooling if this should be found necessary, and are faced with hammered babbitt. Large handholes through the bearing cover, render it convenient for inspection.

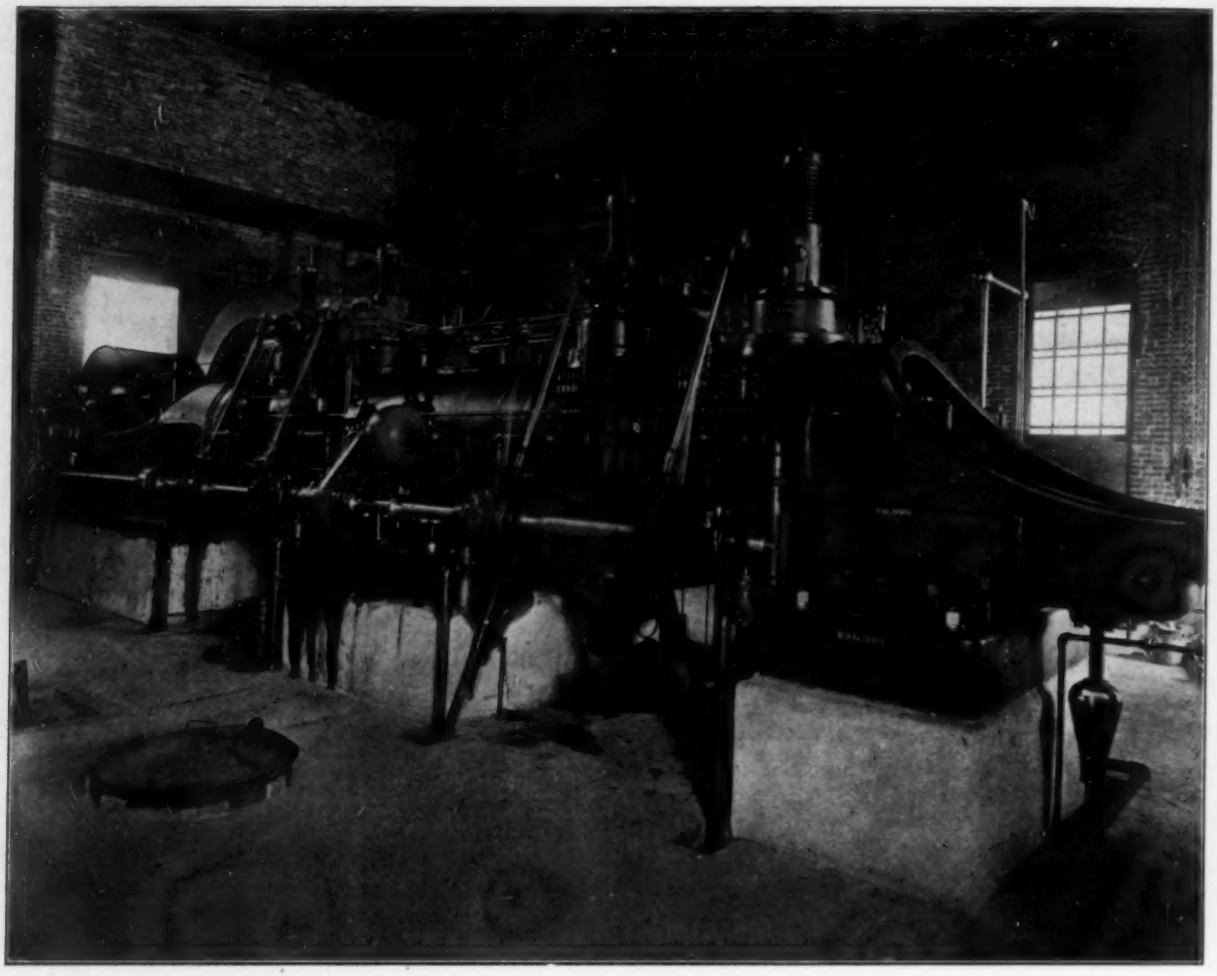

FIG. 2.—500 HORSEPOWER WESTINGHOUSE DOUBLE-ACTING GAS ENGINE AT WARREN, P A. OF SAME GENERAL CONSTRUCTION AS LARGE ENGINE FOR BLOWING SERVICE, AND IDENTICAL WITH EXPERIMENTAL ENGINE OPERATING ON BLAST FURNACE GAS AT CARNEGIE STEEL WORKS.

Connecting Rod.

The connecting rod is made of forged steel with solid ends at both crosshead and crank. The boxes are babbitted and split, with wedge adjustment.

Crosshead.

The crosshead is cast steel with a single babbitted slipper locking over the ends of the crosshead. This avoids reversible stresses or shear in the wedge bolts. The slipper is turned cylindrical inside and out so as to enable its being removed sidewise af-

ter easing off the weight. The crosshead pin is of forged steel with a continuous taper, and is removable through an opening in the housing, with the assistance of a special starting clamp.

Cylinders.

The cylinders are of symmetrical construction, only partly enclosed by jacket walls, a split jacket band closing the opening. This construction permits the ready adjustment of strains due to shrinkage and differential expansion between the cylinder and jacket walls; it also gives access for cleaning the jackets.

A distinctive feature of the cylinder design is the location, vertically, of valve chambers at each end of the cylinder structure for access to the interior. The advantage of this arrangement, especially for dirty gas, is obvious, as by removing a valve at each end of the cylinder, the interior is readily accessible for cleaning through the spacious openings. With any other construction it would be necessary to entirely remove the cylinder head to accomplish this same result satisfactorily. The heads are in one piece and cored with suitable water passages independent of the glands.

Pistons.

The pistons embody several important features in design, as follows: 1, a symmetrical piston structure without internal ribs; 2, permanent mounting on the piston rod. In the case of pistons it has been found advisable to depart from steam engine practice in using of a ribbed box piston, and to employ a structure which is free to expand unrestrained by ribs or webs of any description. This result has been accomplished by a peculiar arrangement of internal parts performing the functions both of a closing piece and a water duct. The pistons are cast in one piece, and when the internal parts are assembled they are forced on the rods with hydraulic pressure. In addition they are secured by a recessed nut, which is afterwards turned off in a lathe flush with the piston surface. This construction is by intention permanent, and, in assembling or dismantling the engine, the piston and rod are handled in one piece.

Piston Rods.

The piston rods are forged from nickel steel, and are made in two pieces with a water duct drilled through the center. They are screwed into the main, center, and rear crossheads and secured by keys. The center crosshead is constructed in the form of a split screw coupling resting upon and doweled into the crosshead support, which is cast as a separate piece and removable sidewise. This coupling thus acts as a closing piece to the piston structure, and enable repairs to be made upon one section of the engine without disturbing the other, during which time the remaining cylinder may be kept in service if necessary. The water duct of each rod section is closed at the ends by plugs, and a deflecting plug is inserted in the center line of each piston for the purpose of diverting incoming water into the piston channels.

Much importance is attached to "floating the pistons absolutely clear of the cylinder walls through adjust-

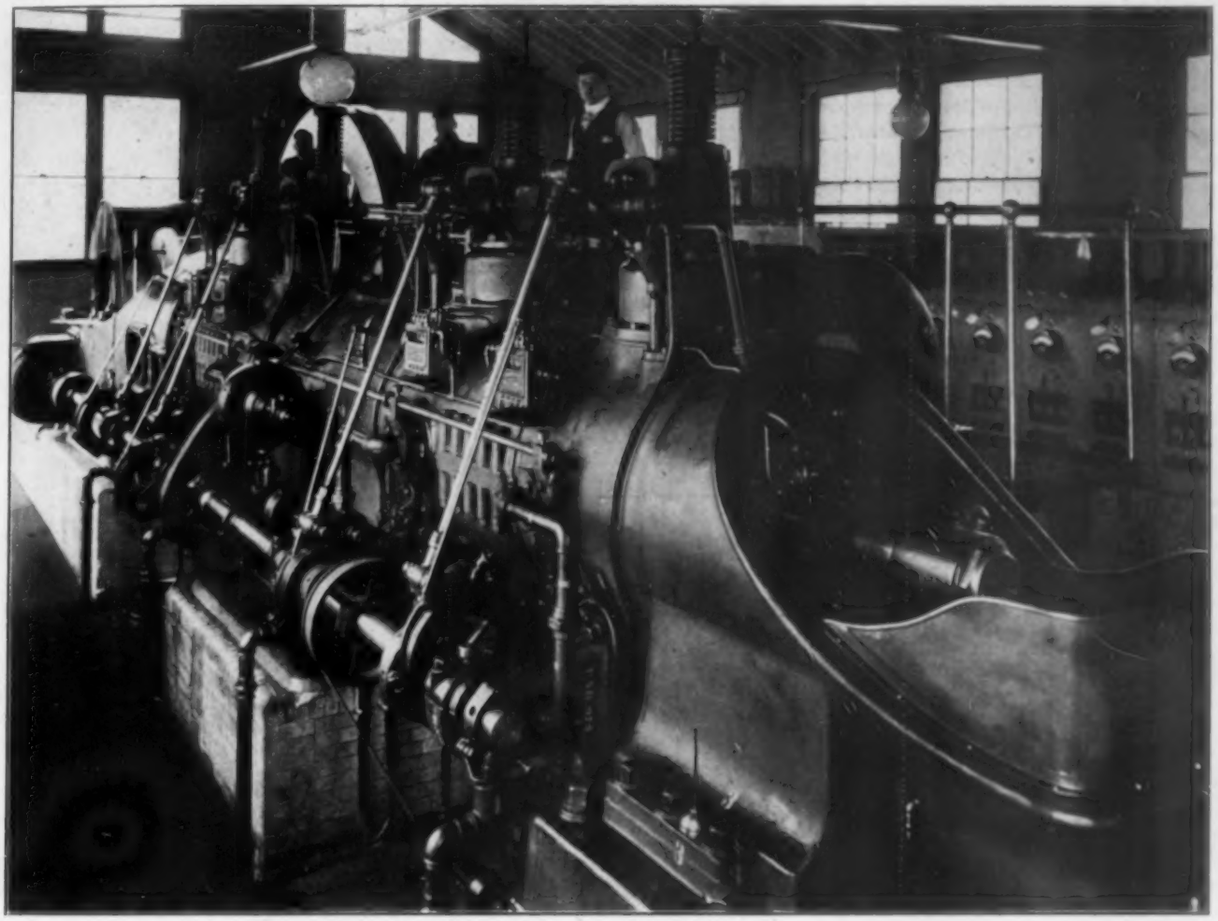

FIG. 3.—500 HORSEPOWER DOUBLE-ACTING GAS ENGINE IN CARNEGIE TECHNICAL SCHOOLS, PITTSBURG. IDENTICAL WITH DOUBLE-ACTING EXPERIMENTAL GAS BLOWING ENGINE OPERATING ON BLAST FURNACE GAS AT CARNEGIE STEEL WORKS.

ments provided at the various crossheads. The rods have been so proportioned that requisite stiffness is provided to carry the weight of the piston without undue flexure, and thus the piston rings alone are in contact with the cylinder, resulting in small friction and wear, especially with dirty gas. Each piston has four segmental cast iron rings set out with flat springs. An important advantage in regard to lubrication will be mentioned under that head.

Glands.

By the use of segmental metallic packing rings arranged in series along the rod the difficult problem of providing tight packing without undue friction has been solved. An important property of this packing is that it "floats," thus easily absorbing slight variations in alignment due to flexure of the rod. The rings are mounted in a separate ring cage, independent of the head, and are removable in one piece.

Valves.

The poppet or mushroom type is used for both exhaust and inlet valves. They are all steel, and seat in the direction of pressure by suitable springs. They are mounted in one-piece bonnets that are removable vertically from the cylinder casting without dismantling any of the lay shaft gear.

The inlet valve performs the functions of both admission and governor valve, but not until gas and air reach the interior of valve itself are they mixed in the proper proportions. Possibility of premature firing is thus reduced to the minimum. There are two distinctive operations in the working of the valve. 1, Vertical motion, opening the gas and air ports to the cylinder; 2, rotation, by which the quantity of mixture admitted is proportioned to the load on the engine. The proper ratio of gas to air is maintained constant by butterfly dampers in the separate gas and air ducts leading from the mains to the individual valves. As each valve is directly under governor control, it thus occurs that the engine can take only such volume of mixture as is needed at the instant to maintain speed; closer regulation is thus more readily obtained than in arrangements where some distance intervenes between the governor valve and inlets. A valuable feature of this valve is that a somewhat richer mixture is obtained on very light loads to insure greater certainty of ignition.

The exhaust valves are driven by separate eccentrics. With a special form of multiplying motion there are obtained two extremely desirable features: 1, concentration of lifting force as the valve leaves its seat against the heavy exhaust pressure; 2, rapid opening as soon as the valve has left its seat. With a comparatively light linkage, great power is exerted at the start, followed by maximum velocity of opening when most desired. The valves are of solid cast steel resting in a cast iron yoke with suitable ports for conducting the in-and-out cooling water. This water rises through the center of the valve and discharges downward through a concentric tube, so arranged as to always keep the valve full of water.

Both inlet and exhaust valves are operated by one lay shaft paralleling the engine cylinders, and geared 2 to 1 direct to the main shaft. Air starting-cams are also mounted on this shaft. A flange coupling near the driving end permits of a small angular adjustment in either direction for facilitating proper valve setting.

The main drive for this lay shaft is a spur gear mounted close to the main bearing upon the main shaft. A cross shaft extending beneath the crank pit transmits this motion to a 2 to 1 bevel gear drive.

Governing.

A "first principle" in sensitive gov-

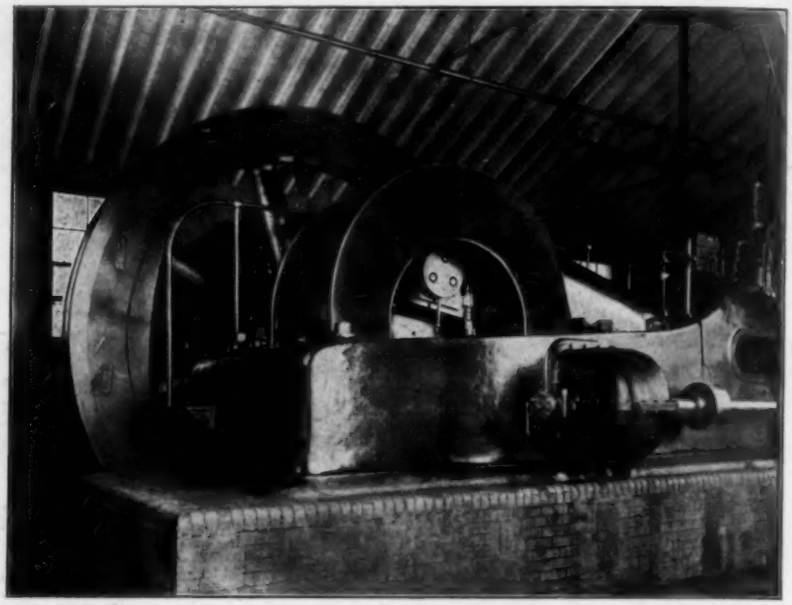

FIG. 4.—DETAILED VIEW OF FORE PART OF CARNEGIE TECHNICAL SCHOOLS UNIT, SHOWING MAIN SIDE CRANK CONSTRUCTION AND LAY SHAFT DRIVE.

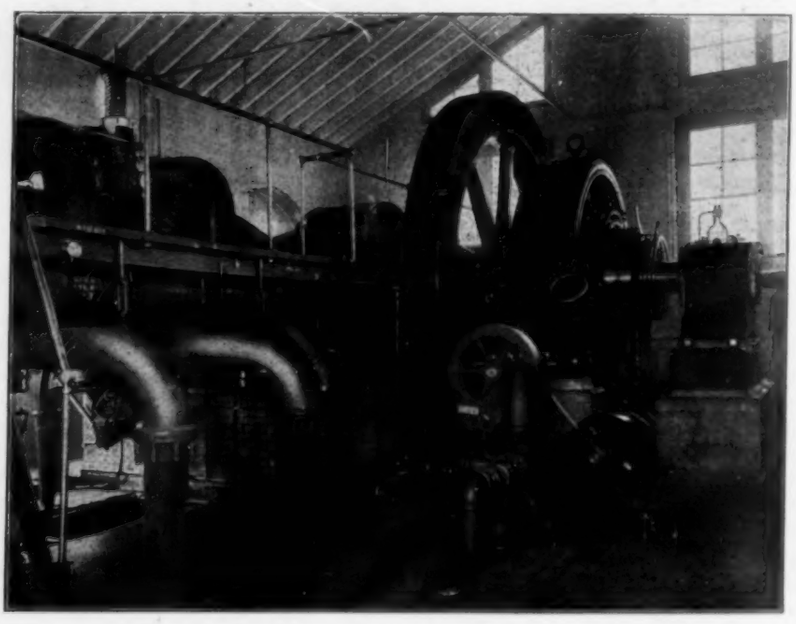

FIG. 5.—DETAILED VIEW OF CARNEGIE TECHNICAL SCHOOLS UNIT, GENERATOR SIDE.

erning is that the regulator must not be required to actuate valves of large mass or dimensions, but rather, that its sensitiveness should be reserved for regulating purposes only. Along this principle, an oil relay system has been developed in which a reciprocating piston, operating under forty to fifty pounds pressure, does the actual work of inlet valve movements. It is controlled by a small pilot valve which is alone actuated by the regulator. As the pilot is balanced, the regulator does very little actual work. This relay system has proven most successful, as also in its application to other forms of massive power machinery. A centrifugal type regulator, of great power and sensitiveness, is driven direct from the main lay shaft through a cushioned gear. A separate cushion dash pot attached to the regulator linkage assists in securing perfectly stable governing, especially at light loads on the engne.

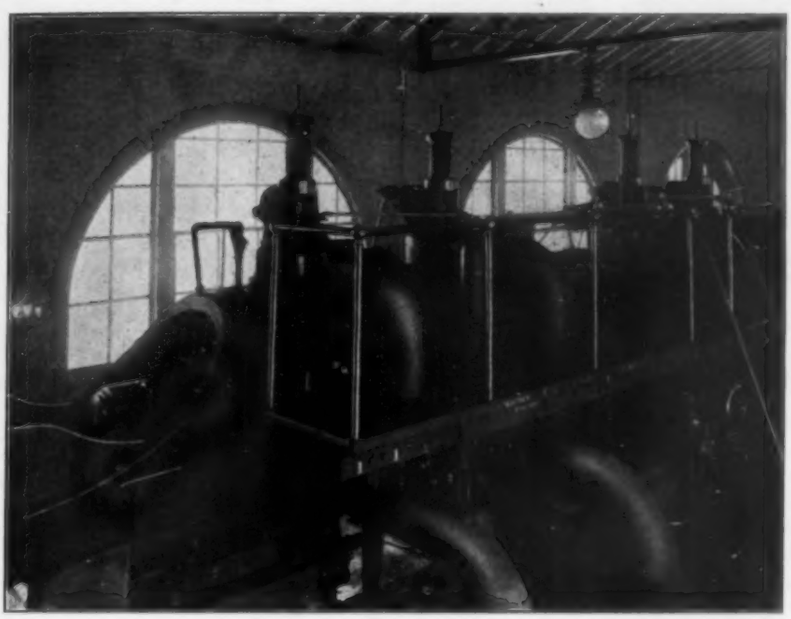

FIG. 6.—REAR SECTION OF CARNEGIE TECHNICAL SCHOOLS UNIT, SHOWING GAS VALVE AND AIR STARTING-VALVE AT RIGHT.

Ignition.

Two independent ignition systems serve the engine at opposite points in the combustion chambers, both of the familiar hammer-break type. They are complete and separate at all points and each serves the other in a purely relay capacity. A small auxiliary lay shaft, parallel and geared to the main shaft, carries four igniter cams set at 90 degrees. A valuable detail of this gear is the provision for simultaneously advancing or retarding ignition in all cylinders while the engine is running. This adjustment is conveniently located on the gear case of the drive and a graduated scale and index gives the exact point of ignition.

All igniter plugs are removable in one piece and any of them may be changed while the engine is running, which is an infrequent, but nevertheless an important necessity. This is accomplished by temporarily cutting off the gas supply from the cylinder end affected and relieving the cylinder compression. This method permits the other end of the cylinder to be kept in service, and requires but a few moments to make the necessary adjustments.

Circulating System.

In this vital detail the builders have incorporated two important points. 1, individual discharge outlets from all the main parts of the engine requiring cooling water; 2, outlets open to the atmosphere so that the exact temperature of the water and its continuity may be determined from time to time by the attendant. In this manner, he quickly discovers a stoppage of the cooling water passages, although this is not likely to happen owing to the large area employed.

Starting System.

A special operating feature of the engine is the simple method of starting, an adaptation of vertical gas engine practice. Compressed air storage tanks in the basement furnish motive power at 200 pounds per square inch pressure. On the engine lay shaft are arranged four cams, engaging the stems of an equal number of small poppet valves which automatically inject compressed air into each combustion chamber at a time necessary to give the forward impulse. No manual adjustment of the valve mechanism is necessary. In starting there are but two operations, viz., 1, opening the compressed air throttle, which sets all starting valves; 2, opening of the gas throttle. Each inlet valve then comes into play in the required order. After the first impulse, gaseous mixture is drawn into the cylinders in the proper proportion, and with succeeding ignitions the engine rapidly comes up to speed. At this point the compressed air system is automatically shut off by the pressure of combustion operating against special check valves at the point of entry to the cylinders.

Oiling System.

Automatic oiling devices have been applied at every possible point. On each end of each cylinder is a small sight feed plunger pump operated from an eccentric. These pumps are filled from a reservoir located on top of the cylinders and separate ducts convey lubricant to several points around the cylinder wall and to the glands. An important point is that the cylinder lubrication is accurately timed so that its effect will not be vitiated by combustion before the lubrication has been accomplished. This also results in a reduction of the oil necessary to run an engine, about one gallon per day.

Engine oil is handled by a circulating and filtering system. It is supplied under gravity pressure, from an elevated tank, to sight feed manifolds on various parts of the engine. A large excess of oil is used, so as to thoroughly flush all working parts, which finally drains back through the filtering system. After thorough filtering and sedimentation it is again elevated to the tank by a small geared pump belted to the main shaft. This system gives most perfect lubrication at the smallest expense for oil.

Stockholders of the Allis-Chalmers Co. have voted favorably on the proposition to issue bonds to the amount of $15,000,000, of which $12,000,000 will be offered at 80 per cent to preferred and common stockholders. The remaining $3,000,000 will be held in the treasury. A syndicate including a number interested in the company will acquire any bonds not subscribed for in this manner.

The British government will appropriate $1,000,000 for the relief of the unemployed during the coming winter.

ELECTRIC FURNACE METHODS OF IRON AND STEEL PRODUCTION.—II.

BY JOHN B. C. KERSHAW.

The Heroult Furnace and Process.

M. Paul Heroult, the French inventor of the process for extracting aluminum from its oxide by electrolysis, was born in Thury Harcourt—Normandy—in 1863, and was educated at the local school of science as a mining engineer. He was only 23 years of age when he patented his process for aluminum extraction, and in 1887, he was acting as technical manager of the first erected aluminum works in Europe—at Neuhausen. As stated in the first article of this series, Mr. Heroult turned his attention in 1899 to the production of ferro-chrome, ferro-silicon and ferro-tungsten in a modified form of the electric furnace used for aluminum production; and it was the success of these attempts that suggested to him the use of electric heating in the iron and steel industry. Two distinct furnaces and two distinct methods of work have resulted from these experiments—the one a tilting electric crucible furnace for steel manufacture, the other a modified form of the blast furnace, with electric heating for pig manufacture. These will now be described in the order named.

The Heroult Electrically Heated Crucible Furnace.

This furnace is shown in sectional elevation in Fig 2. It consists of a closed shallow iron tank, thickly lined with a refractory material which will stand the high temperature attained within the furnace, without undue softening or corrosion by the slag. This lining consists of dolomite brick, with magnesite brick around the openings. The hearth is formed of crushed dolomite, rammed on top of the dolomite brick lining of the bottom of the furnace. The furnace is mounted on two racks, the bottom of the furnace being gear sectors which permits of its being tipped sideways and held at any desired angle, for discharging purposes. At the opposite side from the discharge lip, there is an inlet for the air, blast, and also an insulated supporting framework for carrying the two massive solid carbons, *a*, 1.70 meters in length, and 360 millimeters square, which convey the electric current. These can be moved either in a vertical or horizontal direction, by use of the gearing shown in Fig. 2. Openings are provided in the top of the furnace cover for charging for insertion of the two electrodes, and also for the escape of the gases produced on heating the charge. This latter can be effected either by arc or resistance heating. In the former case, the electrodes are allowed to touch the surface of the slag or metal, and are then raised upwards to the limit of distance which the arc will strike with the current and voltage at command. Two arcs will be formed under these conditions—one as the current enters the charge of slag or metal, and one as it leaves the same—while in between these two points the current will traverse the slag and produce resistance heating.

When resistance heating only is desired, the two electrodes are lowered until they dip beneath the surface of the charge, and the current in this case passes from one to the other entirely by the materials forming the same.

The method of producing steel in this furnace is as follows: A charge of steel scrap, pig iron, iron ore and lime, in the requisite proportions and quantities, is placed in the furnace, and this is raised to the melting point by combined arc and resistance heating. The slag formed by the lime and silica of the ore, now arises and floats on the surface of the molten metal, and the further heating of the charge occurs by allowing the electrodes to dip just beneath this slag, but not into the metal beneath it. An air blast is now allowed to enter the furnace at some suitable point. Under these conditions, the impurities of the iron and steel scrap become oxidized, and enter the slag. By pouring off this slag, therefore, and by renewing the materials which form it once or twice, a very pure product can be obtained. The process is in reality a washing-out process in which the slag acts as solvent. The fact that all the heating with this type of furnace occurs without any actual contact between the carbon electrodes and the metal also conduces to purity of the products—since no silicon or carbon can get into the iron or steel from the electrodes. When the iron in the crucible has been raised to the requisite degree of purity by this washing-out process, a calculated amount of an iron alloy high in carbon (carburite) is added, and the resultant steel (of known carbon content) is tipped into the casting ladle.

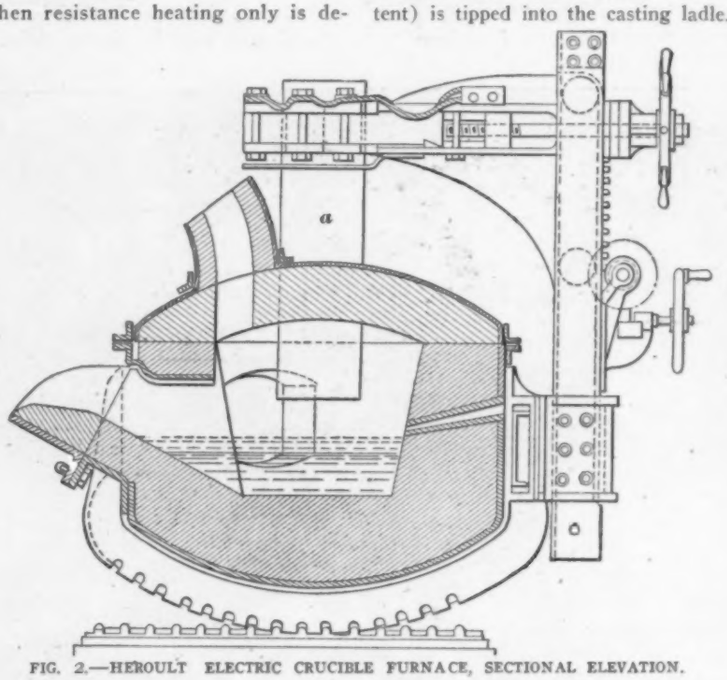

FIG. 2.—HEROULT ELECTRIC CRUCIBLE FURNACE, SECTIONAL ELEVATION.

A similar method is followed when making ferro-alloys, the requisite weight of alloy high in the percentage of the metal or element desired being added to the contents of the crucible just before tipping.

The crucible furnaces usually employed for this process, produce three tons of finished steel per charge and two charges per day of 20 hours, the current required being 4,000 amperes at 120 volts pressure, or 480 kilowatts. The following table shows the average composition of this steel:

Iron	over 99 per cent
Carbon	0.60 per cent
Manganese	0.15 per cent
Silicon	0.03 per cent
Phosphorus	0.003 per cent
Sulphur	0.007 per cent

One of the test runs made by the Canadian commission of experts at La Praz with the Heroult steel furnace gave the following results:

The charge was made up of 3,307 pounds of iron scrap, 330 pounds of

Note.—The first article of this series appeared in THE IRON TRADE REVIEW of June 28, 1906.

iron ore, and 246 pounds of lime; being purposely made small to reduce the time requisite for finishing the charge. When the charge had arrived at a tranquil molten state, the slag was poured off, and every care was taken to remove all of this from the metal left in the crucible. A new slag was then formed by adding the following materials: Lime, 55 pounds; sand 15.5 pounds, and fluor spar 15.5 pounds. When this slag had been melted it was likewise poured off and a new charge of slag-forming material similar in weight and constitution was placed in the furnace. This formed the finishing slag, and after its removal 1.5 pounds of ferro-manganese was added to the molten mass, and the crucible was tipped for discharge. The total time required for finishing the charge was 4½ hours and 2,829 pounds of steel of the following chemical constitution were obtained:

Carbon	0.079 per cent
Silicon	0.034 per cent
Sulphur	0.022 per cent
Phosphorus	0.009 per cent
Manganese	0.230 per cent
Arsenic	0.096 per cent
Copper	traces.

The physical properties of this steel were good. The electrical energy required for its production was 1,410 kilowatt-hours equal to 0.153 electrical horsepower-year per ton of 2,000 pounds of finished steel.

A second trial run yielded a steel of high carbon content testing as follows:

Carbon	1.016 per cent
Silicon	.103 per cent
Sulphur	.02 per cent
Phosphorus	.009 per cent
Manganese	.150 per cent
Arsenic	.06 per cent
Copper and aluminum	traces.

The time required by the charge was eight hours, and the electrical energy consumed was 2,850 kilowatt-hours, corresponding to 0.153 electric horsepower-year per ton (of 2,000 pounds) of produced steel. By the use of water cooled electrodes, the consumption of the carbon electrodes per ton of steel has been greatly reduced. The estimated cost of converting iron scrap into steel by the Heroult furnace is $14.00 per ton of finished steel. No allowance is made in this estimate, however, for the original cost of the scrap iron, and power is taken at $10.00 per electrical horsepower per year.

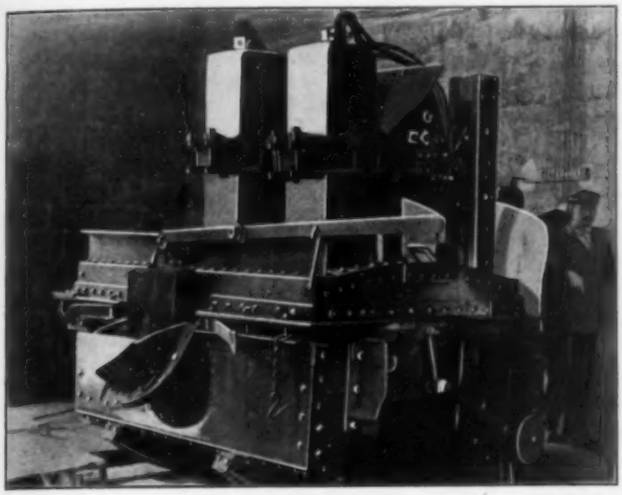

FIG. 3.—THE HEROULT ELECTRIC CRUCIBLE FURNACE, CHARGED.

FIG. 4.—THE HEROULT ELECTRIC CRUCIBLE FURNACE, DISCHARGING.

At La Praz, high grades of steel are made, varying from tool-steel of exceptional hardness, selling at $363 per ton of 2,000 pounds, to tough mild steel, selling at $123.2 per ton.

M. Heroult claims for this process of steel making, that the quality of the raw material used is a matter of indifference. Steel containing only 0.01 per cent of sulphur and 0.01 per cent of phosphorus, can be produced from scrap containing 0.15 per cent sulphur and 0.30 per cent phosphorus. In his type of electric crucible furnace, Heroult claims that he has the temperature of the metal and oxidation of these impurities entirely under control, and he asserts that by this control the de-sulphurization and de-phosphorization of the raw materials have been brought to a high degree of certainty and perfection. Heroult also claims that at a cost of 50 cents per ton he can make out of any steel delivered into his tipping crucible furnace *"in the molten state"* a metal containing less than 0.01 per cent of each of these two impurities.

As already stated, the Heroult steel making furnace and process are in operation at La Praz, and Froges in France, at Kortfors in Sweden, and at Remscheid in Germany, while the Halcomb Steel Co., of Syracuse, N. Y., has recently constructed a plant for the production of 80 tons of steel per day, by the Heroult furnace and process. Figs. 3 and 4 show the Heroult crucible furnace in operation. The cost of a 2,500-kilogram tipping furnace with all the accessories, is given by Heroult as $10,000,—while another $5,000 would be required for the electrode-making plant. The electrodes are made from retort coke using tar as a binding material. The finished electrodes cost, at La Praz, 10 centimes per kilogram, with coke at 50 francs per metric ton.

The Heroult Smelting Furnace and Process.

The original form of this furnace is shown in sectional elevation in Fig. 5. The principle of the furnace is the continuous supply of the half fused ore and fluxing materials to a column of coke, maintained at red heat by means of an electric current and resistance heating. *A*, in Fig. 5, is the channel by which the ore and fluxing materials are supplied to the vertical reducing zone of the furnace, while *H* is the shaft by which the coke is charged. The gases passing away from the hot zone, pass up through *A*, and thus heat the ore and fluxes before these arrive at the vertical portion of the shaft. *G*, *F'* and *B* are solid carbon blocks whose function is to act as electrodes—the current treminals being placed at *I* and *J*. The electric current, passing from *B* to *G* through the coke, maintains this at a red heat, and as the pasty mass of ore and lime passes between the carbon blocks *F* and *G*, it is likewise heated by the current and rendered more

fluid. The liquid charge of ore and lime in its later descent through the hottest zone of the furnace (*L*) spreads out,—and during its passage through the hot coke the iron oxide is reduced to metallic iron, which collects in the hearth and is run off through the tapping hole *D*.

This experimental furnace has been somewhat simplified in the light of more extended experience, and the smelting furnace used in the trial runs for the Canadian commissioners at La Praz consisted only of an iron box of square cross section, lined with refractory material and open at the top. The bottom of the casing was provided with a carbon plate, which acted as one electrode of the circuit, the other being a movable block of carbon of square cross section, three feet in length, and placed vertically in the open top of the furnace. The distance between the electrodes was varied by hand regulation. The charge, consisting of finely divided ore and coke, was placed in the space between the two electrodes, and also around the upper electrode, and fresh ore was added as that in the lower part of the furnace was reduced. The following are the details of the runs made with this furnace: Kilowatt-hours, 3,280; equal to 0.50 electrical horsepower-year. The total output of pig iron was 2,130 pounds, and the power used was therefore 0.47 electrical horsepower-year per ton of 2,000 pounds of pig iron. At $10.00 per electrical horsepower-year, the cost of the electric energy required for the smelting operation was, therefore, $4.70 per ton of pig iron produced.

In a paper read in America in 1904, M. Heroult stated that the profitable production of pig iron in the electric furnace was only feasible under certain conditions which did not obtain in most countries, and therefore the practical application of the Heroult smelting furnace and process in Europe, has been confined to the production of a few hundred tons of pig iron, chiefly for experimental purposes, at Froges and at La Praz in France. However, publication of the Canadian expert commissioners' report paved the way for a trial of the Heroult smelting furnace in Canada, and a grant having been made by the Canadian government for the purpose, a small furnace was erected at Sault Ste. Marie, and experimental smelting of Canadian ores, was commenced at that place in February of the present year under the superintendence of M. Heroult himself.

The official report of these trials has not yet come into the writer's hands, but Dr. Haanel, the superintendent of mines in Ottawa, recently read a paper giving some information relating to them, before the Canadian Club of Toronto. Dr. Haanel states that about 55 tons of pig iron have been made in 150 runs with this experimental furnace. The first trials were made with ordinary hematite ore, but after the furnace had got into good working order, Canadian magnetic ores, high in sulphur content, from various localities were utilized. Wood charcoal was used in place of coke, which is not produced in Canada. Experiments were also made with roasted and briquetted nickel-iron

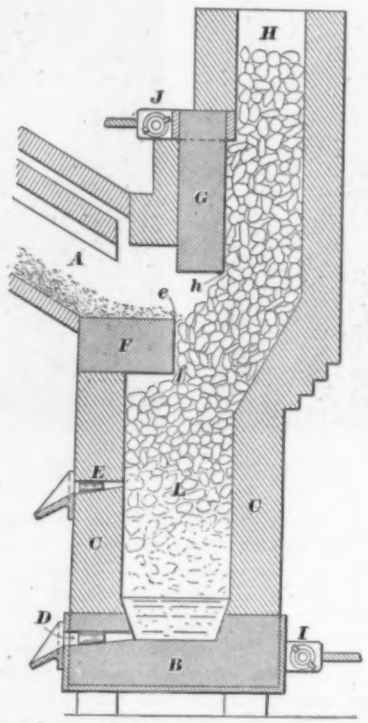

FIG. 5.—HEROULT ELECTRIC IRON SMELTING FURNACE, SECTIONAL ELEVATION.

ores, which are found in large quantities in the neighborhood of Sault Ste. Marie. These yielded a metal containing 4.5 per cent of nickel and only 0.006 per cent of sulphur.

The results on the whole are claimed to have been most promising, since the yield of metal per horsepower was greater than that obtained at La Praz, and the estimated cost of the electrodes was lower than stated in the commissioners' 1904 report. M. Heroult estimates that good pig iron can be produced at Sault Ste. Marie at a cost of $10.00 per ton. The fact that the electric smelting furnace can produce good pig from ores which cost only $1.25 per ton, and are unsuitable for use in the ordinary blast furnaces, is also claimed as another point in its favor. The burnt pyrites from sulphuric acid works, and titaniferous ores containing up to five per cent of titanium oxide, are said to be other ores of little value at present which can be utilized in the Heroult electric smelting furnace. Further information relating to these experiments and to the industrial developments which may be expected to arise from them at Sault Ste. Marie, will therefore be awaited with interest,—for it is evident that M. Heroult imagines that he has found in Canada the exceptional conditions required for the development of a profitable and flourishing electric iron smelting industry.

The financial aspect of this question, and the writer's own opinions upon the claims made for the Heroult process will be published in Article VII of this series. The next article will deal with the Keller furnace and process.

Mexican Industries.—Consul James A. Le Roy, of Durango, Mexico, calls attention to the fact that the deposits of iron in that country, notably the great iron mountain on the outskirts of Durango, are as yet but little worked. The iron and steel plant at the "iron mountain" is at present shut down, the company being involved in litigation. The largest iron and steel plant in Mexico is located at Monterey, and is constantly turning out a greater quantity of structural iron and steel. The greater part of structural iron and steel being used in Mexico still comes, however, from the United States and elsewhere abroad. There are iron foundries scattered about the country, but mostly they are but small affairs, doing repair work or turning out merely crude and small manufactured articles. There are the big mining camps and smelters, with their repair and construction shops, etc., and there are besides the railroads of the country with their shops. The order has been given for the construction of large new shops and a roundhouse at the terminus of the Mexican International railroad in Durango and work is now beginning, the presumption being that this is done with a view to the extension of this line, either from Durango across the Sierra to Mazatlan or to Guadalajara through Zacatecas State, or both extensions.

Increase in Building.—For the first half of 1906, building in the larger cities, according to *Construction News*, aggregated $275,625,437 against $247,695,691 for the corresponding period a year ago. This is an increase of 11 per cent.

A NEW TYPE OF GAS CLEANER FOR BLAST FURNACE GAS.

A new form of gas cleaner has been devised by Patrick Meehan, Lowellville, Ohio, on which a United States patent has been granted. The cleaner is shown in the accompanying illustration, and the following is a short description thereof.

The invention consists essentially in conducting the gas through a series of water-sealed chambers, which are so constructed that the gas will be repeatedly thrown against the surface of baffle-plates in these chambers, thus causing the dust and other impurities in the gas to be beaten out and slide down into the water and thereby removed from the gas. The chambers are so arranged that the gas will be given a whirling motion against the baffle-plates, in order to knock down the contained dust and to thoroughly mix the gas and cause all portions of it to come in contact with the baffle-plates.

Fig. 1 is a longitudinal cross section through the apparatus, and Fig. 2 is a horizontal section taken on the line XX of Fig. 1. The gas from the blast furnace is led to the cleaner through the pipe *a*, and discharged from it to the hot blast stoves, boilers, etc., using the purified gas, through the pipe *b*. The cleaner proper comprises two or more water-sealed chambers arranged in series with passages for conducting the gas through these chambers in succession. Two such chambers are shown in the illustration, denoted by the letter *c*. One chamber would be sufficient in some cases, and three or more could be used, if desired. The chambers are preferably provided with dome-shaped tops, and the lower ends project into a large reservoir, *d*, in which water is maintained at a constant level, as shown in Fig. 1. The lower ends of the chambers *c* are open but project sufficiently far into the water to form an effectual water-seal. The pipe *a* is continued down into the chamber *c*, into fairly close proximity to the surface of the water, in actual practice it being a distance of from 8 to 12 inches above the surface. A series of plates, *e*, Fig. 2, extend radially from the center to the perimeter of pipe *a*. These plates are arranged on a spiral to give a whirling motion to the gas and to discharge the dust with a whirling motion against the surface of the water below. The spiral plates extend some distance below the lower end of the continuation of the pipe *a*, and most of the gas will escape through the open sides formed by these plates, while other portions will pass down underneath the lower edges of the plates, whose effect is to direct the dust into close proximity with the surface of the water.

A partition wall *f* surrounds the inlet pipe, so as to leave an annular space between it and the inlet pipe and a similar space between *f* and the outer walls of the chamber *c*. The lower end of this partition wall extends into the water, so as to form a water-seal, while the upper end projects fairly close to the top of the chamber, thus causing the gas to rise after leaving the inlet pipe and then flow downward through the annular space between the partitioned wall and the outer wall of the chamber. In this outer annular space are arranged a series of plates, *g*, extending spirally downwards, to give the gas a spiral trend and throw out any dust which may still remain in the gas and direct it to the surface of the water. These plates terminate some distance above the surface of the water, leaving a free space for the gas to pass underneath into the second chamber of the cleaner.

The second chamber is substantially the same as the first, the gas passing through it in the reverse direction, from which it passed through the first chamber. The openings in the two chambers are connected by a suitable passageway, formed by a hood plate bridging the space between the chambers and extend-

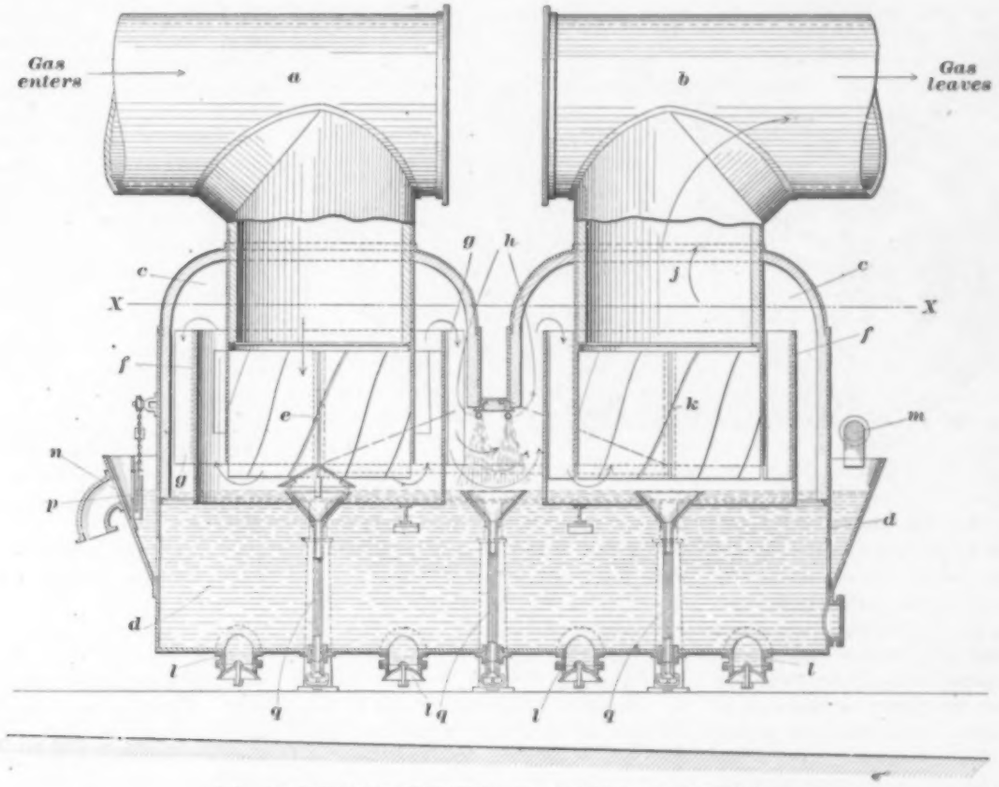

FIG. 1.—SECTIONAL ELEVATION OF MEEHAN GAS CLEANER.

ing from side to side of the tank. The passageway between the two chambers is practically the full width of the tank *d* and equal to the diameter of the chamber *c*, thus giving a wide passage from one chamber to the other.

In case extremely dirty gas passes through, as may result from a slip in the blast furnace, a spray of water is provided for removing the major portion of the impurities. The spray is accomplished by placing a pair of perforated spray pipes, *h*, in the passageway between the two chambers, the pipes extending transversely across the tank and provided with suitable controlling valves for admitting the water. The pipes are so arranged as to spray the water vertically downward. The gas must flow through this water, thus washing out the impurities contained therein. It is necessary to dry the gas after this operation, and for this purpose, the outlet pipe *j* is provided with a number of drying or baffle-plates, *k*, ten such plates being shown extending radially from the center of the pipe to the outer edges. These plates are preferably arranged on a spiral.

When the furnace is working normally the spray pipes *h* will not be in use, the remainder of the apparatus being sufficient to take out all of the dust in the gas. It is preferred not to spray the gas with water unless absolutely necessary, as the temperature will be somewhat reduced thereby, and it is desirable to maintain the temperature as high as possible.

To protect the cleaner against the high temperature of the gases, the chambers and pipes are, so far as possible, lined with fire brick or other heat resisting material.

The reservoir *d* is provided with a series of openings, *l*, in the bottom, which are closed by bell valves, kept shut by a system of levers and counterweights. The tank can be flushed out through these openings, a trough shaped bottom permitting the dirt and other impurities to be washed down readily.

The reservoir *d* is provided with a water from any suitable source, the water entering through the opening *m*. An overflow pipe, *n*, removes all water which rises above a certain level, which is maintained by the gate *p*. The gate is vertically adjustable in suitable guides, so that its height and consequently that of the water level may be varied, as desired.

The surface of the water is kept clear of scum formed by the impurities removed from the gas by means of an outflow from the gas by means of an outchamber *c*. In the present instance, this is accomplished by means of a vertical pipe, *q*, arranged centrally at each sealed chamber, the pipes being provided at the upper end with funnels which are a short distance below the surface of the water. The surface water will flow down through these pipes, thus creating currents in the chambers at the surface of the water and keeping it clear of impurities. The pipes are provided with suitable valves for regulating the flow of water through the chamber, the purpose being to have the flow so slow that it will not lower the level of water in the chambers, and destroy the water-seal. The pipe in the first chamber is provided with a hood to prevent it from being clogged with sudden rushes of very dirty gas, resulting from a slip in the furnace.

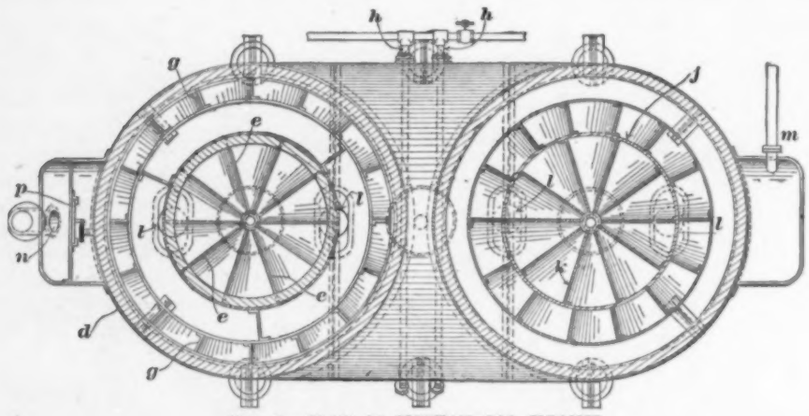

FIG. 2.—PLAN OF MEEHAN GAS CLEANER.

The Sewer Pipe Trade Association, which has been on trial at Jamestown, N. Y., on charges of controlling the production, selling territory and prices of sewer pipe, has been dissolved. This action was taken as the result of a proposition submitted by the association's attorney by which its members agreed to discontinue the organization. This was accepted by the district attorney.

The construction of a new blast furnace at the works of the Societe de l'Oural-Volga, at Tsarytsine, in the Oural district of Russia, has just been commenced.

COKE MANUFACTURE IN 1905.

The report of the manufacture of coke in 1905, by Mr. Edward W. Parker, statistician of the United States geological survey, which is now in course of preparation, will show that the output for 1905 exceeded that of all other years in the history of the industry. Not only was the amount of coke manufactured greater, but the percentage of increase in production over that of previous years was larger. The amount of coke manufactured in the United States in 1905 was 32,231,129 short tons as compared with 23,661,106 short tons in 1904, indicating an increase of 8,570,023 short tons or 36.22 per cent. The value increased in still greater ratio, from $46,144,941 in 1904 to $72,476,196 in 1905, a gain of 57.06 per cent. This proportionate increase in the value of the coke production appears to have been induced by an extraordinary but legitimate demand created by the unprecedented production of pig iron in nearly every iron making district of the United States. As a result of this the average price per ton advanced from $1.95 in 1904 to $2.25 in 1905.

This great activity in the coking centers was further illustrated by the marked increase in the number of ovens built in the United States. In 1905 there were 519 coke-making establishments which owned 87,564 ovens, against 507, owning 83,599 ovens, in 1904.

Of the total number of completed ovens in the United States in 1905, 3,159, or 3.61 per cent were of the by-product recovery type and the total amount of coke made in these ovens was 3,462,348 short tons, or 10.74 per cent. There were under construction at the close of 1905, 4,751 ovens, of which 417 were of the retort by-product type. The by-product ovens in operation during 1905 were distributed as follows:

Alabama, 280; Illinois, 120; Maryland, 200; Massachusetts, 400; Michigan, 135; Missouri, 50; New Jersey, 100; New York, 399; Ohio, 130; Pennsylvania, 1,089; Virginia, 56; West Virginia, 120; Wisconsin, 80.

Of the more important producing states, Pennsylvania is credited with a total production in 1905 of 20,573,736 short tons, or 64 per cent of the total, with an increase over 1904 of 5,712,672 short tons, or 65.5 per cent of the total increase for the United States. West Virginia, the second state in producing importance, contributed 3,400,593 short tons, or 10.5 per cent of the total, and is credited with 1,117,507 short tons or 13 per cent of the increase. Alabama's production increased

from 2,340,219 short tons in 1904 to 2,576,786 short tons in 1905, a gain of 236,767 short tons. Alabama's production in 1905 was equal to eight per cent of the total for the United States, while the increase in the state was less than three per cent of the total increase for the country. Virginia's production, most of which was from the more recently developed districts in Wise county, increased from 1,101,716 short tons to 1,499,481 short tons, while the combined output of Colorado and Utah increased from 789,060 to 1,378,824 short tons, a gain of 589,764 short tons, or 74.74 per cent.

There were only four states in which the coke production in 1905 did not exceed that of the previous year. These four states, all of which have a comparatively unimportant output, were Georgia, Kansas, Missouri, and Montana.

In the great Connellsville district of Pennsylvania, where more than one-third of the total coke production of the United States is obtained, the output of coke increased from 8,883,220 short tons to 11,365,077 short tons, while the value advanced from $13,990,329 to $22,315,361, the average price per ton advancing from $1.58 to $1.96. The lower Connellsville, or Klondike district, shows a gain from 2,887,456 short tons in 1904 to 3,871,310 in 1905, while the value increased from $4,623,133 to $7,532,382. The Flat Top district in Virginia and West Virginia, which is the principal coke-producing center outside of Pennsylvania shows an increase of 50 per cent in the output, from 1,427,689 short tons in 1904 to 2,169,589 in 1905, while the value increased nearly 90 per cent, from $2,084,565 to $3,817,666.

Altogether, conditions in the coking districts were more satisfactory in 1905 than they have been for a number of years.

The mineral output of the Bilboa district of Spain, according to the British consul-general there, is rapidly diminishing. There was a larger output in 1905 than in the preceding year, but some part of this increase, he says, is due to the greater care paid to the washing of the smaller ores and of old refuse heaps, the results of which are added in certain proportion to the lumpy ores. He says that it is naturally very difficult to form an estimate of the amount of the mixture, but he thinks it amounts to between 600,000 and 700,000 tons per annum. The total iron ore exports last year from that district were 3,960,526 tons.

DARK SECRETS IN FOUNDRY PRACTICE.[1]

BY WM. H. PARRY.

In these latter days we are becoming quite accustomed to congratulate ourselves on our wonderful progress. In many lines of endeavor this is certainly true; and while the foundry practice of our country will more than compare favorably with that of any other nation, yet there is a tendency, in some quarters at least, to throttle progress by guarding trade secrets (?) for fear of financial ruin.

Let us consider a few practices in foundries still prevalent, from the viewpoint of a looker-on, rather than as a foundryman. In Hoboken, N. J., last June, there was given an exhibition of a new method of making gray iron castings in iron molds. This statement in itself is not startling, for it is done frequently enough. But in this case the castings when cool enough to handle were also soft enough to drill and file. In this particular instance the castings were four-inch soil pipe elbows, averaging a quarter of an inch in thickness. The mold in question was a three part affair, the two upper portions being hinged to the lower, and making between them, when closed, the outer form of the elbow, and space for the sprue and riser. A green sand core was used with an arbor designed to set firmly at the ends of the mold.

Just previous to the commencement of casting operations, the mold was coated with a mixture known only to the inventor. Then the mold was heated long enough from the inside, by placing sows from the first tap of iron, until the heat penetrated to the outside. All dirt was blown out, and the third act of the comedy took place. This was the application of another coat of liquid, which it is hardly necessary to state was also a dark secret. The green sand core was placed in position, the mold closed and locked, iron poured in, and in a few minutes the mold was opened, the sprue and risers knocked off, and the casting taken out. The operations were then repeated several times, with the exception that the mixture was not used, this being guaranteed to last a day.

An examination of the castings showed that at the farthest point from the sprue, at the outside, were innumerable cold shuts; in fact, the castings were not by any means first-class, though this was the very thing claimed for the process.

In this, as well as many other attempts to improve foundry methods, the practical side was entirely lost sight of by the promoters. Supposing the mixtures and liquids were all that was claimed for them, the use of the iron molds would be limited to repetition work of the simplest kind anyhow. Their relatively high cost, and possible short life due to distortion, would not tend toward economy, and continuous melting and a plentiful supply of molds would be necessary, to say nothing of the fact that the core had to be made in the ordinary way.

It seems a pity indeed that the ingredients of the twin liquids are not known for our edification, and that a harder iron than the one used was not taken. With the iron running silicon 2.34, sulphur 0.07, phosphorus 0.280, manganese 0.44, combined carbon 0.26, graphite 3.27, it will be seen that with a hot iron mold, likely coated with powdered aluminum, and a regular green sand core, an iron of this composition could not come out hard, whatever its physical characteristics due to casting into a metal mold.

In the diamond polishing industry, a small proportion of which this country is permitted to share with Belgium and Holland, through the importation of operators and material from those back-number countries, there is a little item in foundry practice that is worth while delving into. Not because of its commercial value, which is nil, but rather to show up a foundry octopus in this age of trust exposures.

All diamond operators are united in the belief that the metal disks used for cutting and polishing diamonds can only be made in Holland or Belgium. For they naively say, the secret of the composition has been kept in certain families for centuries. The disks in question are about 11½ inches in diameter, and ⅝ or ¾ inch thick, and are rotated at a very high speed in a horizontal plane. The upper face is smeared with a mixture of olive oil and "bort" or diamond dust. The stones to be polished are placed about this disk, weighted, and in due time are ground down to the desired shape.

It is conceded that the best wheels are made in Antwerp, by DeWinter & Son, and an analysis shows that all that is required is a good grade of open-grained cast iron. The necessity for the open-grain is to provide minute pockets for the lodging of the diamond dust while performing its functions. In other words it is a case of "diamond cut diamond." Perchance some day a member of the American Foundrymen's Association may be called upon to specialize in diamond polishing wheels, so here is the analysis of the

[1] A paper presented at the Cleveland (June, 1906) meeting of the American Foundrymen's Association.

castings:—Silicon 2.70, sulphur 0.063, phosphorus 0.302, manganese 0.44, combined carbon 1.60, and graphite 1.37.

In making castings that require a chilled surface there appears to be a lack of knowledge, or at least a lack of the desire to part with that knowledge on the part of those individuals who may be fortunate enough to possess it. There should be determined once for all what results are obtained from a given mixture cast at a given temperature and against chills of a certain thickness, with the range due to variations in each. This problem does not seem impossible of solution and the tables thus constructed would be invaluable.

Having some experience with chilled work on small castings where the chills were used solely to insure solidity at a certain spot, the statement was made to me by a foreman to whom complaint was made—that the last lot of castings were porous—that the chills were probably too old. Upon investigation it was found that the chills were free from fire-cracks, and otherwise in good shape though used intermittently for some twenty years. Drillings taken from the side of the chills on the contact side gave:—silicon 2.07, sulphur 0.073, phosphorus 0.0312, manganese 0.48, combined carbon 0.23, and graphite 2.41. From these figures it would seem that while the chills were almost old enough to vote, that were not decrepit by any means.

Co-operation Invited.—Prof. Charles E. Lucke has been retained by the department of agriculture to prepare a bulletin for publication Jan. 1 on the use of alcohol in small engines. The necessary investigations will be conducted in the laboratories of Columbia University. The bulletin will be of interest from the fact that it will be published on the date when the denaturized alcohol law becomes effective. The scope of the work is so extensive that Prof. Lucke asks co-operation of all interested, and he especially desires to hear from any having patents on the subject of vaporizers, carburettors or complete engines which can be submitted for tests.

A correspondent of the London *Commercial Intelligence* predicts a famine in Russia this year. An exceptionally dry spring has ruined crops, and in many provinces governmental aid for the peasants will be necessary. Owing to continuous strikes the situation in the manufacturing industries is very precarious.

RAPID WORK

IS NOW BEING DONE IN MAKING ORE SHIPMENTS.

Litigation About Titles.—New Developments in Open Pit Mining.—Blast Furnace at Seattle.—Operations at the Burt-Poole.

(Staff Correspondence.)

OFFICE OF *The Iron Trade Review.*
Duluth, July 21.

Everything has worked much more smoothly in the handling of ore during the past week and the shipping interests anticipate the biggest week of the season.

The week has brought to light the filing of papers some time ago alleging fraud in the obtaining of the titles to the Albany mine by the present owners. The complaint is that the adult heirs of Stephen F. Dudley who held a conditional homestead right to the land were indequately compensated for the transfer of the title to the present owners as a result of misrepresentation of the value of the land and also that the minor heirs were not considered at all. The suit is similar in many respects to the Clark case which has been running in the courts for a fortnight and represents the outcroppings of negotiations which have been in the undercurrent for two or three years, relative to the efforts of present owners of mining properties in clearing up their titles. The allegations of fraud can hardly be substantiated and are for the most part technicalities, though in the Clark case they have developed largely. In the present instance a settlement between the present owners and the plaintiffs has been reached which establishes the titles of the owners last recorded. A settlement figure has been quoted, but that is unauthorized as the papers have not been filed nor the terms of settlement made public. The owners are Mrs. L. A. Day, eleven-twelfths, and the Illinois Iron Lands Co., one-twelfth. The Albany mine is a milling property operated by the Crete Mining Co., which is Pickands, Mather & Co. Although there are a great many of the mining properties the present titles to which are subject to the same attack there is little prospect of similar action in other cases, as efforts are being made quietly to clear up the questions which past carelessness has placed upon many of the titles to mining lands.

Stripping Operations.

One of the later developments on the Mesabi is the application of the open pit system of mining to properties that in former days it was deemed necessary to work underground. Examples of this are at the Sellers and the Pillsbury mines. At the Sellers mine stripping has been begun at the southeast end of the property where two Marion shovels working toward each other are cutting a right of way under the D. M. & N. tracks to lead out to the proposed dump. The county road runs right across the property to be stripped and piling is being driven now which is to be the support for a bridge to carry the road over the mine. Most of the land has yet to be cleared and the machine shop tracks will have to be removed. Work is to be pushed as rapidly as possible and ore will be shipped in no great length of time. C. S. Simpson, who is also superintendent of the Burt, is directly overseeing the work.

The other instance is at the Pillsbury mine which was originally an underground proposition laid out without an engineer by Capt. George Orr, a famous character among the mining men of the Hibbing district and one who would have none of those "d—paper engineers." The mine was well laid out, but the shaft was only 169 feet deep and in these days an ore body of that depth lends itself readily to open pit operation. At present a pit about 100 feet in diameter has been opened and the ore is being shoveled by hand by a force of some twenty-five men and hauled in small cars to the foot of the old shaft. The Wallace Contracting Co. has two Bucyrus steam shovels stripping on the southern bank and a steam shovel and two locomotives just arrived to begin cutting a new approach, so that the old Pillsbury will soon be a full fledged open pit. As open pit mining, on the average, costs less than half as much as underground work per ton, the reason for these changes where at all feasible is very evident.

New Furnace at Seattle.

The return of Alfred Merritt to Duluth from the coast has confirmed the rumor of the proposed building of a new furnace at Seattle, Washington. The contracts have been let for the construction of a 300-ton furnace under the direction of Walter Kennedy, of Kennedy Bros., of Pittsburg, who will also be superintendent of the furnace. Details of the furnace are not yet obtainable from Mr. Kennedy. The venture is undertaken with seemingly good reason. The Merritts have patent rights upon two iron mines, one in San Bernardino county, Cal., called Cave Canyon mine and one in Lyons county, Nevada.

The Cave Canyon mine is situated one-half mile from San Pedro on the Los Angeles and Salt Lake railroad and 224 miles from the harbor of San

Pedro. The property is one mile long and 600 feet wide and shows an outcrop of ore on the west end 2,000 feet long and of an average width of 300 feet. The ore is a soft red hematite, stratified and sloping 70 degrees toward the south. It is a steam shovel proposition and the deposit is estimated at 20,000,000 tons. Assays made at various times show the following analyses:

Iron	63.30	60.61	68.35
Silica	5.	10.42	1.22
Phos.	.045	.052	.028

The mine in Nevada is located 13 miles from the main line of the Southern Pacific and a road must be built to it. The area of the group of 13 claims is 260 acres running entirely across section 6, township 17, north of range 23 east. The ore outcrops here also and the largest amount exposed is 900 feet each way and 200 feet high and is taken to indicate a vein at least 900 feet wide and 4,000 feet long. The ore is a brown hematite of medium softness and the strike of the vein is nearly north and south. Analyses of this ore show the following contents:

Iron ...	64.40	64.79	65.81	65.80
Phos. ..	.022	.028	.017	.002
Silicon .	3.10	Sul. .062		1.12

Estimating a depth of 100 feet on the average for the ore it is believed that there are 36,000,000 tons in the deposit.

The company also has coal lands in Pearce county, Wash., 45 miles from Tacoma, which are five miles long and a mile wide, and it also has determined upon sites for a furnace and coke ovens. Under the present rates the following estimate indicates the commercial value of the location. The figures are for a ton of pig iron produced:

Mining 1.7 tons of ore.....	$ .43
R. R. freight on 1.7 tons of ore at $2.25	3.83
Vessel freight 1.7 tons of ore at .75	1.28
Dockage	.40
2,500 pounds of coke	4.50
Limestone	.60
	$11.04

As compared with the present price of pig iron on the coast, which is from $23 to $26, this cost of manufacture leaves a very gratifying profit, on paper, at least, and in consideration of the fact that the present consumption of pig iron on the coast is 80,000 tons per annum, the building of the new furnace seems to be amply justified.

Operations at the Burt-Poole Mine.

In proportion to the area stripped, few mines on the Mesabi range have yielded more ore than the Burt-Poole. Last year 1,860,452 tons were shipped and this season from ten to twelve thousand tons are being taken out daily which means the handling of about 500 cars and the employment of 200 men. This rapid excavation of ore has, however, given rise to mining difficulties which are just now hampering operations materially. The stripping is not far enough in advance of the mining and for the depth of the mine and the switching necessary the space available is much confined. Having made quite a record under such difficulties, E. C. Phelps, the assistant superintendent who four years ago opened up the Burt but was last year transferred to the Morris, is again in charge of the pit.

The eastern end of the mine belongs to the Burt fee and the deeper and western end to the Poole fee. Two grades of ore, Pillsbury and Tubal, are being shipped from both the Burt and Poole properties. At present there is one shovel working toward the eastern end of the pit on the north side in Tubal ore and two shovels near the center of the mine in Pillsbury. From the eastern end of the mine a narrow bank of ore about 35 or 40 feet high juts into the pit for some distance and on its southern face, which rises vertically, this bank shows one of the headings of the old underground Burt mine into which workings this year's stripping operations have carried the open pit Burt. On the southern bank also may be seen entrances into drifts and the timbering of the abandoned mine. The shaft house of the old Burt still stands, but that of the Day mine which was just east of it has been torn down. Of the two shovels in Pillsbury ore one is working on the north side of this re-entrant bank but progress is limited there because all of the sand has not been stripped off above. The other shovel is working downward toward the west and deeper end. The present cut is the fourth level in the Poole end which is down about 150 feet.

There are three shovels stripping, the Winston-Dear Co., having one working on the north bank and Porter Bros., of Duluth, two on the eastern end. The Winston-Dear Co. formerly was doing all the stripping, but turned its old contract over to Porter Bros., who expected to remove 1,500,000 cubic yards by July 10. They have stripped only 900,000 yards up to this time, however, and while one shovel is to be taken out shortly the other will be required for a couple of months. The Winston-Dear Co. received a new contract the first of the year and the stripping is to be extended a couple of hundred yards to the eastward and southward. The new 800-foot approach, which was cut this spring by Porter Bros., has just been finished and the last track laid last week. The new approach enters the mine along the southern side, but is built through the same cut under the railroad as the old approach which runs into the mine on the north side.

All of the steam shovels at this mine, both the three operated by the Oliver Iron Mining Co. and those belonging to the stripping contractors, are Bucyrus shovels made in South Milwaukee. Two horizontal tubular boilers built by the Northwestern Steam Boiler & Mfg. Co., of Duluth, furnish steam for the Cameron pump which carries off the water from this mine and the Sellers.

The New Hartley Mine.

At the beginning of the year the Oliver Iron Mining Co. began clearing the land for the opening up of this new property. A. Y. Peterson, who is also superintendent of the Myers and St. Clair mines, has charge of the work. On the first of May stripping was begun and at the present writing a long narrow strip several hundred feet in length and about seventy-five feet in width has been opened. There is considerable variation in the depth of the over burden owing to the rolling nature of the ground, the two extremes being about 18 feet in the hollows and in the neighborhood of 80 feet on the knolls.

The ore body is long and narrow and is located in section 23 58-20, taking in the northwest of the northeast and the northeast of the northwest. In itself the Hartley is a somewhat limited deposit, but adjoining property is ore-bearing and the complete future development is uncertain as to extent. The stripping will require about three years and it is expected that shipments of ore will begin next summer, as the stripping is to be continued right through the winter. The approach to the mine has not been started as yet, but will lead in from the southwest.

The Oliver Iron Mining Co. erected this spring thirty houses on the location and a frame machine shop, 40 x 140 feet, which is to include carpenter and blacksmith shop, has been built though not yet equipped. The foundations for a round house capable of accommodating four engines have been completed and a warehouse is to be started at once. A 200-foot shaft has been sunk for water and for draining off the ore body. Two 72 x 18 horizontal tubular boilers built by the Kewanee (Ills.) Boiler Works Co., for which breechings were furnished by the Gogebic Boiler Works of Duluth, are being set up. There are about two hundred men working on the excavations now and a new shovel is to be put in soon. The Oliver Iron Mining Co. is doing its own stripping under the captaincy of William McLeod.

INCREASED TONNAGE

For Ore Carrying Will be Available For Next Season.—Nine Vessels Ordered.

Contracts have been closed during the past ten days for nine steel freighters for service on the Great Lakes. Their aggregate tonnage is about 95,000 tons, and counting 18 loads to the season they will add nearly 1,750,000 tons to the ore-carrying capacity of next season. Five of these vessels will be built by the American Ship Building Co., and four by the Great Lakes Engineering Co. All are for delivery at the opening of navigation. The Pittsburg Steamship Co. placed orders for three vessels with the American Ship Building Co. and for one with the Great Lakes company. They are to be duplicates of the J. Pierpont Morgan and the H. H. Rogers, 600 feet over all, 580 feet keel, 58 feet beam and 32 feet depth. Pickands, Mather & Co., ordered two freighters, 552 feet over all, 532 feet keel, 58 feet beam and 31 feet depth. One will be built by the Great Lakes company and the other by the American Ship Building Co. The latter company closed with Charles O. Jenkins, of Cleveland, for a steel steamer to be a duplicate of the Charles S. Hebard, of the Wilson fleet. This will be 524 feet over all, 504 feet keel, 54 feet beam and 30 feet depth. For W. P. Snyder, the Great Lakes company will build a freighter 574 feet over all, 554 feet keel, 58 feet beam and 32 feet depth. The same company will construct a 7,500 ton boat for certain Pennsylvania furnace interests. This will be 440 feet over all, 420 feet keel, 52 feet beam and 28 feet deep. Including these orders the American Ship Building Co. now has booked 18 freighters for delivery at the opening of navigation next spring, the Great Lakes Engineering Co. has booked six and the Toledo Ship Building Co., three.

A substantial increase in the manufactures of Greater New York is shown by statistics recently announced by the census bureau. In 1905 the city had 20,838 establishments, with an invested capital of $1,042,946,487, and a product of $1,526,523,006, as against 19,243 establishments in 1900, with a capitalization of $853,238,133 and an output valued at about $1,170,000,000. Brooklyn's leading industry was in its foundries and machine shops which showed a heavy increase in value of production.

The project is being considered by the Russian government, of double tracking the Trans-Siberian railroad.

UNIONIST MURDERERS.

New York Commercial.

One of the most brutal and cowardly murders in the history of crime in this state must be charged up against organized labor, in addition to the long list of other crimes, big and little, for which it is directly responsible. A watchman employed by the contractor for a steel-frame hotel structure in this city, in order to protect his non-union men from assault and petty annoyances by union men, was set upon last Wednesday by a gang from the latter's organization, the Housesmiths' and Bridgemen's Structural Ironworkers' Union, beaten and pummelled and kicked unmercifully and then hurled down to a floor three stories below—and to his death. The attack was witnessed by responsible persons not connected with it, and before the victim breathed his last he positively identified four of his assailants. They are John Enright, William Kufen, John Behan and George M. Smith. There are undoubtedly others equally responsible for this murder whose identity only a thorough investigation can discover.

They should all pay the death penalty in the electric chair as speedily as the machinery of the courts can place them there. They are part of the old "Sam" Parks band of unionists—men born and bred and schooled in an atmosphere of law-breaking and graft, with no sense of honor and no respect for law, each with his hand raised always against society and everything that makes for order and decency and justice; desperate men, who detest honest work and who labor chiefly with the purpose of robbing their employers; men of the most bitter prejudices, who have been trained to believe that there is no place on earth for free, independent labor, who abhor the "open shop"and who would take human life almost any day in order to prevent non-unionists from earning their bread; open and avowed enemies of honest industry, who prefer bullets and sand-bags and brass "knuckles" to calm reasoning and knock-out drops to arguments. For years the rank and file of this organization have been arrayed in open hostility to employers in the New York building trades, a constant thorn in the flesh of local enterprise and the cause of enormous losses through strikes and "hold-ups." They have constituted a standing public nuisance—a menacing evil always to be reckoned with when planning the upbuilding of the metropolis.

And now they have been caught red-handed—as was inevitable so long as they operated their vicious system uninterfered with. These four murderers from out their ranks deserve not a shadow of mercy—only the fate that Biblical and statute law metes out to those who kill. Let their trial be orderly but swift, their sentence and execution immediate!

And wherever and whenever and however organized labor seeks to defend these culprits and thus to cheat justice, let honest public opinion brand it as a murderous enemy of society. Unionism, whatever there is decent in it, cannot afford to offer aid and protection and sympathy to bloody murderers.

ALLIS-CHALMERS' AIR BRAKE STAFF.

J. H. Denton, formerly general superintendent of the National Brake & Electric Co., has been engaged to act as manager of the new air brake department of the Allis-Chalmers Co., Milwaukee, which is arranging for the manufacture of the Christensen devices. Shop facilities are being provided. The entire second floor of the north shop at the Reliance works, now occupied by the general offices, will be utilized for this purpose. Shipments may be expected within 75 days. A staff conversant with air brake practice has been organized with the following men: F. C. Randall, formerly vice president and general manager of the National Electric Co., and who for the past year has been manager of the New York district office of the Allis-Chalmers Co; W. W. Power, formerly manager of the National Brake & Electric Co.'s Philadelphia office, and recently appointed manager of the Philadelphia district office of the Allis-Chalmers Co.; Geo. C. Voigt, formerly of the National Electric Co., who will have charge of air brake sales in western territory, and George C. Dresser, until recently with the National Brake & Electric Co., who is to be attached to the Allis-Chalmers Co.'s New York office, as a special representative of the air brake department.

The Erie Railroad Co. has placed orders for 1,600 new freight cars. The Standard Steel Car Co. will build 500 drop-end steel underframe gondola cars of 100,000 pounds capacity at its Butler shops for delivery in January next. The same company will build 500 steel flat cars and the American Car & Foundry Co.'s works, at Detroit, will turn out 500 produce cars with steel underframe for November and December delivery. At the Detroit works of this company, 100 Hart convertible cars will be built for delivery during January.

The University of West Virginia is arranging to establish a school of mining engineering, which, it is stated, will be one of the most pretentious schools of its kind in the country.

Market Develops a Strong Undertone.

In the face of adverse foreign influence, the New York stock market ruled comparatively dull during the past week, but developed a strong undertone and held its own with a slight advance late in the week as the result of a rallying movement. The return of menacing conditions in Russia, which sent English consols, French rentes and Russian bonds to the lowest prices of the year and materially affected the London, Paris and Berlin exchanges, exercised little influence on engagements of gold for shipment to this country aggregated $2,500,000 and the bank statement at the end of the week disclosed large improvement over the week previous. The situation was further strengthened by the success of Secretary Shaw with the issue of $30,000,000 two per cent Panama bonds. These were over-subscribed several times at bids which will permit of the placing of the entire issue at between 103½ and 104. In spite of these many favorable

FINANCIAL NOTES.

Recent dividend declarations include the following: Detroit Iron & Steel Co., 5 per cent on preferred stock, payable Aug. 1; Bethlehem Steel Co., regular quarterly on preferred, 1¾ per cent, payable Aug. 1; The Pullman Co., regular quarterly, $2 per share, payable Aug. 15; United States Radiator & Boiler Co., regular quarterly, 1½ per cent, payable July 20; United States Graphite Co., regular quarterly, 2½ per cent, payable July 26; Cambria Steel Co., regular semi-annual, 1½ per cent, payable Aug. 15.

A director of the Cambria Steel Co. makes the statement in connection with the prospective betterment expenditures that "if during the next two years earnings should increase so phenomenally as to warrant an increased dividend, after payment for these expenditures, it would, of course, be considered." The company plans to expend about $5,000,000 in betterments. It is now paying dividends at the rate of 3 per cent.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. July 14	Closing Quotation July 21	Changes	Date of 1906 Ann. Meet.	Par Value	Capital Outstanding	Dividend Basis	Dividend Being Paid	Dividend Date Last Div. Dec.
Allis-Chalmers Co	16¾	16⅝	− ⅛	Sept.	100	19,820,000			
Allis-Chalmers preferred	46½	46⅜	.....		100	16,150,000	7 cum	.....	Feb., 1904
American Can	6¼	6⅛	.....	Apr. 24	100	41,233,300			
American Can preferred	52½	52	− ½		100	41,233,300	7 cum	5 Q.	July, 1906
American Car and Foundry	34	35⅛	+1⅛	June 28	100	30,000,000			May, 1905
AmericanCar and Foundry preferred	98½	99⅞	+1⅜		100	30,000,000	7 n. c.	7 Q.	July, 1906
American Locomotive	68	69¾	+1¾	Oct. 16	100	25,000,000		1¾	July, 1906
American Locomotive preferred	115	114½	− ½		100	24,100,000	7 cum	7 Q.	July, 1906
American Shipbuilding	62	65⅛	+3⅛	Oct. 2	100	7,600,000	4	4 Q.	Apr., 1906
American Shipbuilding preferred	106	105½	− ½		100	7,900,000	7 n. c.	7 Q.	Apr., 1906
American Steel Foundries	10	10⅛	+ ⅛	Oct. 3	100	17,700,000			
American Steel Foundries preferred	42¾	42⅝	− ⅛		100	17,700,000	6 cum	.....	Aug., 1905
Barney & Smith	65	65	.....	June 5	100	1,000,000		.....	June, 1894
Barney & Smith preferred	145	135	−10		100	2,500,000	8 cum	8 Q.	June 1906
Bethlehem Steel	23	22	−1	April 3	100	15,000,000		.....	
Bethlehem Steel preferred	86	86	.....		100	15,000,000	7 n. c.	7 Q.	Aug ,1906
Bullock Electric preferred	111	111	.....	Oct. 2	100	1,000,000	6	6 Q.	July, 1906
Cambria Steel	33¾	34¼	+ ½	March 20	50	45,000,000	6	3 Q.	Aug., 1906
Cambria Iron	49½	49½	.....		50	8,468,000	4	4 S. A.	Apr., 1906
Colorado Fuel & Iron	46½	49¾	+3¼	Oct. 15	100	30,132,000	7	.....	Apr., 1902
Wm. Cramp & Sons Ship & Eng. Bldg. Co.	16	18	+2	May 31	100	6,098,000	5	.....	Nov., 1902
Crucible Steel	10¾	11¼	+ ½	Oct. 17	100	25,000,000		.....	
Crucible Steel preferred	75	75⅝	+ ⅝		100	25,000,000	7 cum	.....	June, 1906
Empire Steel	3	7	+4	Feb. 28	100	2,281,400		.....	
Empire Steel preferred	33	38	+5		100	2,500,000	6 cum	2 S. A.	July, 1906
Fay & Egan	93½	93½	.....	Feb. 20	100	1,000,000	6	6 Q.	May, 1906
Fay & Egan preferred	128½	128½	.....		100	1,000,000	7 cum	7 Q.	May, 1906
General Electric	160¼	163	+2¾	May 8	100	48,256,050	8	8 Q.	July, 1906
International Pump	43	42	−1	June 5	100	12,202,500		2	July, 1905
International Pump preferred	83	82	−1		100	8,850,000	6 cum	6 Q.	Aug., 1906
Lackawanna Steel	71	65	−6	March 14	100	34,971,400		.....	
Lake Superior Corporation	17	17	.....	Oct. 3	100	40,000,000		.....	
Niles-Bement-Pond	130	130	.....	Feb. 7	100	5,000,000	6	6 Q.	May, 1906
Niles-Bement-Pond preferred	105	106	.....		100	2,000,000	6 cum	6 Q.	June, 1906
Otis Elevator Co	48	48	.....	March 19	100	6,350,300		2 A.	Apr., 1906
Otis Elevator Co. preferred	98	98	.....		100	5,589,500	6 n. c.	6 Q.	July, 1906
Pittsburg Coal Co	13⅜	13½	.....	Feb. 12	100	30,135,000		.....	
Pittsburg Coal preferred	50	52	+2		100	30,716,200	7	.....	Apr., 1905
Pressed Steel Car	44¼	47⅝	+3⅜	Feb. 21	100	12,500,000		3	Aug., 1904
Pressed Steel Car preferred	95	97	+2		100	12,500,000	7 n. c.	7 Q.	May, 1906
Pullman Palace Car	219	221	+2	Oct. 18	100	74,000,000		8 Q.	Aug., 1906
Railway Steel Spring	46½	49¾	+3¼	March 1	100	13,500,000		4 S. A.	Oct., 1905
Railway Steel Spring preferred	97¾	99	+1¼		100	13,500,000	7 cum	7 Q.	June, 1906
Republic Iron & Steel	24⅞	26	+1⅛	Oct. 17	100	27,362,000		.....	
Republic Iron & Steel preferred	93	95⅛	+2⅛		100	20,862,000	7 cum	7 Q.	Apr., 1906
Sloss-Sheffield	69¼	72	+2¾	March 14	100	7,500,000	5	5	Jan., 1906
Sloss-Sheffield preferred	106	105	−1		100	6,700,000	7 n. c.	7 Q.	July, 1906
Tennessee Coal & Iron	142	150⅜	+8⅜	May 15	100	22,552,800		4 Q.	Aug., 1906
U. S. Cast Iron Pipe & Foundry	45⅞	46¾	+ ⅞	June 27	100	12,500,000		2	Sept., 1906
U. S. Cast Iron Pipe & Foundry preferred	91¼	89	−2¼		100	12,500,000	7 n. c.	7	Sept., 1906
U. S. Steel	33⅛	36	+2⅞	April 16	100	508,302,500		.....	Dec., 1903
U. S. Steel preferred	100¼	102⅞	+2⅜		100	360,281,100	7 cum	7 Q.	May, 1906
U. S. Steel 5's	97	97⅝	+ ⅝		100	463,798,000	5	5 A.	
Virginia Iron, Coal & Coke	40	40½	+ ½	Sept. 18	100	8,641,600		.....	
Westinghouse Electric	152	151	−1	June 27	50	20,996,350	10	10 Q.	July, 1906
Westinghouse Air Brake	148	146	−2	Oct. 2	50	10,990,450	20	20 Q.	July, 1906

American financial affairs. There was evident a growing disposition to give more just consideration to repeated indications of unsurpassed activity in manufacture and commerce and to bumper crop reports. The money situation was improved through the known attitude of the secretary of the treasury and his willingness to lend his support wherever weakness developed. The statement of our foreign trade for the last fiscal year showed the largest foreign commerce and excess of exports on record. Foreign factors, however, the market was only fairly active and sales were not large on any day. This was doubtless due to the end of the liquidating movement which had prevailed for some time and indicated strength rather than weakness. Iron, steel and manufacturing stocks shared largely in the week's trading and in most cases netted slight advances. Both preferred and common Steel gained more than two points, while Tennessee Coal & Iron and Colorado Fuel recorded still larger gains.

NEWS FROM MANY INDUSTRIES.

New Buyers:—

The New Orleans Scrap Metal Co., New Orleans, La., has been organized with a capitalization of $50,000 to deal in metals and machinery of every description. The officers are: Garnet W. Coen, president, and Mark A. Morse Jr., vice president.

The O'Reilly Elevator Co., Chicago, has been organized with a capitalization of $25,000 by P. J. O'Reilly, James Lamb and Rufus Foster.

The Daub Mfg. Co., Pittsburg, Pa., has been organized with a capital of $75,000 to manufacture and deal in gas engines, hydro-carbon burners, etc. The incorporators are: A. F. Bennett, Pittsburg; Frank Montgomery, Allegheny; W. J. Benson, Homestead; Oscar E. Daub, Crafton.

The Universal Portland Cement Co., Gary, Ind., has been organized with a capitalization of $1,000,000 to manufacture and produce cement, etc. The incorporators are: Edward M. Hagar, Thos. J. Hyman and Eugene J. Buffington.

The Houston Engineering & Machine Co., Houston, Tex., has been organized with a capitalization of $45,000 by J. J. Stettegast Jr., George Guild, A. J. Binz and Gus Dreyling.

The Lizzie Lowman Co., of Sheffield, Ala., recently incorporated with a capital stock of $36,000 by B. J. Lowman, S. A. Lowman, J. L. Andrews and L. W. Payne, will manufacture stoves, ranges, metal castings, disc harrows, plows, cultivators, etc. This will make the fourth stove works for Sheffield but the manufacture of disc harrows will also be pushed by the new concern.

The Quick Unloading Car Chute Co. has been organized in Birmingham, Ala., by Dr. J. W. Stagg, J. E. Brazeal, of Birmingham, and J. B. Whitehead, of Atlanta, the capital stock being placed at $10,000. The objects of the company are to manufacture a patented car unloading chute. The principal office will be in Birmingham.

The Eastern Forge Co., which is to be moved from Nashua, N. H., to Portsmouth, N. H., has been incorporated under the new name of the Portsmouth Forge Co., with a capitalization of $100,000. The officers are: John Herbert, president; Mathew T. Denham, treasurer; Herbert A. Buck, clerk, and H. H. Stinson, J. W. Kelley and W. H. Hackett, directors. New machinery will be installed and the new plant will be ready for occupancy by Oct. 1.

The Danville Foundry & Machine Co., Danville, Pa., has been organized by F. H. Vannan, T. J. Price, C. E. Haupt, I. Vannan, C. L. Foulk and R. B. Pursel to take over the business formerly conducted by Daniel M. Curry under the firm name of Curry & Co.

The Pittsburg Pneumatic Co., Canton, O., has been organized with a capitalization of $250,000 to manufacture hand riveters, yoke riveters, chipping hammers, drills and other pneumatic tools. The directors are: Frank M. Faber, president and general manager; Charles H. Johnson, treasurer and superintendent; Charles C. Murray, secretary.

The Briggs Co. has been organized with a capitalization of $9,700 to take over the business of the Briggs Mfg. Co., Middletown, Conn., manufacturing machine tools, dies and metal small wares. The officers of the company are: D. Luther Briggs, president; Walter S. Wilcox, vice president, and Harry E. Powell, secretary, treasurer and business manager.

The Bailey-Perkins Motor Co., Springfield, Mass., has been incorporated with a capital stock of $20,000 to manufacture motors, engines and machines. The officers of the company are: President, Bertram Bailey, No. 49 Catherine street; treasurer, James A. Perkins, No. 17 Salem street; clerk, W. L. Van Sicklen, No. 41 Matoon street, all of Springfield, Mass.

The Eagle-Church Co., Lowell, Mass., machinery, has been chartered with a capital stock of $5,000. The officers are: President and clerk, Charles A. Smith, No. 49 Warwick street; treasurer, Henry W. Church; both of Lowell, Mass.

The Lewis Power Co., chartered with a capital stock of $40,000, will manufacture railroad cars, motor cars, etc. The incorporators are: Henry Oppenheimer, No. 145 West 143d street; Frederick Kopper, Jr., No. 160 West Eighty-first street; Edwin A. Weed, No. 62 West Sixty-eighth street, all of New York, and Oscar P. Lewis and Francis V. Lewis, No. 62 Putnam avenue, Brooklyn.

New Construction:—

The Schartle Bros. Machine Co., Middletown, O., is to erect a machine shop 80 x 200 feet of steel construction with re-enforced floors at an expenditure of $60,000.

Plans have been completed and contracts let by the Ohio Central railroad for the construction of a new boiler shop at Bucyrus. This will replace the old boiler shop at the Bucyrus works, and will double the company's capacity. Extensive improvements are also to be made at the Kenton shops, on the western division, where passenger equipment repairs will be made.

The Art Stove Co., Detroit, has occupied its new six-story warehouse. It is of brick construction 80 x 100 feet and provides storage room for about 30,000 stoves.

The Ohio Elevator & Machine Co., Columbus, O., which has been incorporated for $250,000 by Charles H. Brown, Owen T. Snyder, F. M. Taylor, L. T. Sater, W. J. Sauer and Mathew Posshinger, will occupy the plant of the new American Elevator Co., recently purchased by Mr. Sauer. The new company will absorb the Snyder-Taylor Elevator Co., of Columbus, and will largely increase the capacity of the plant, adding a general machine business and a steel casting department. Mr. Sauer is one of the principal owners of the American Machine Co., Louisville, Ky.

The Joestling & Schilling Co., St. Paul, is building an addition to its stove plant which will provide much needed room in the assembling department.

The Acme Iron Bed Co., St. Paul, is installing a new cupola and enlarging its foundry. These improvements will enable the company to double its output.

The Lima Locomotive & Machine Works, Lima, O., is making important improvements to its plant, which include a large addition to the erecting shop as well as a roomy office building. A large lathe for turning locomotive drivers, frame slotter having a 32-foot bed, flue flanging machine and some heavy riveters have recently been installed.

The Park Wagon Stock Co., St. Paul is erecting an addition 80 x 126 feet, of brick construction. This will be used for the woodworking department.

The Lancaster Machine & Structural Works is erecting a new plant at North Lancaster, Pa., which will include a foundry, structural shop, machine shop, smith shop and a fire-proof pattern-shop of cement block construction. The equipment for the new company has not yet been purchased. A cupola and other foundry machinery will be required.

The Hoosier Stove Co., Marion, Ind., has under construction an office build-

ing, wareroom, mounting room, foundry, washroom, rattling room and pattern room. The buildings, which are to be of steel, will be completed by Sept. 4, and will be ready for occupancy by November.

The new ore dock of the Chicago, Milwaukee & St. Paul, at Escanaba, was placed in commission July 19, and the first cargo of ore was taken out by the steamer Mecosta. The new dock represents an expenditure of about $1,000,000.

The United States Cast Iron Pipe & Foundry Co. is making important improvements to its plant at Addyston, O. A number of new buildings are being erected in order to care for the contract recently closed with the American Pneumatic Supply Co. for 80,000 feet of pneumatic tube piping and for other large orders.

The Stratton & Bragg Co., Petersburg, Pa., has outgrown its present plant and has commenced the erection of a machine shop at the rear of its premises, 31 and 33 North Sycamore street.

An extensive new plant is in course of construction at Parsons, Kan., by the Missouri, Kansas & Texas railroad, which will include locomotive shops, blacksmith shops, general repair shops, etc. Orders for power equipment, including boilers, generators, etc., are being placed by the consulting engineer, G. R. Henderson, 20 West Thirty-fourth street, New York.

The Interstate Iron & Steel Co., Chicago, has purchased a tract of 21½ acres adjoining its plant at East Chicago, Ind., on which it will erect a new shipping dock and storage yard.

Ground has been broken at Teaque, Tex., for the general machine shops of the Trinity & Brazos Valley railroad. Work is to be completed by Sept. 30.

The Sylvan steel mill of the Republic Iron & Steel Co., Moline, Ill., is again in operation after a week's shutdown for repairs. During this time the old boilers were dismantled and five Sterling 250-horsepower water tube boilers were installed. The steel building now in the course of construction will be completed by the last of August.

The Zanesville Malleable Iron Co. is to double the capacity of its plant at Zanesville, O. An addition to the foundry 160 x 200 feet will be erected, and a 15-ton melting furnace installed. The annealing room will be extended a distance of 100 feet and will be equipped with five new 20-ton annealing furnaces.

The Washburn Steel Co., Minneapolis, maker of the Washburn car coupler, is drawing plans for an entire new plant. This will consist of an office building, machine shop, foundry, pattern shop, storage building and laboratory. Although the site of the new plant has not yet been definitely decided upon, the company has already started on the manufacture of certain machinery which will be required.

The Seattle Foundry Co., Seattle, Wash., which was incorporated in April, has been reorganized with a capitalization of $30,000 and will hereafter be known as the N. & S. Foundry Co. A foundry building 45 x 85 feet and a pattern and storage building will be erected as soon as plans can be prepared.

The Minneapolis Steel & Machinery Co., Minneapolis, is building an 80 x 100 feet addition to its foundry for use as a core room. Four large ovens are to be installed and later an addition will be made to the office. This company has been enjoying a remarkable trade in contracting for mining buildings, having recently finished a number of buildings for the Garfield smelter of Garfield, Utah. It has also completed the steel work for the amphitheater on the state fair grounds, a structure 150 x 359 feet and 87 feet high.

The new plant of the Lane & Bodley Co., Cincinnati, is located on a tract of 20 acres within the city limits, and on it about three-fourths of a mile of joint spurs of the B. & O. and Belt line have been laid. A fully equipped foundry, 300 x 130 feet, has been erected and is in operation. Adjoining this the steel structural work is now erected for a machine shop 320 x 160 feet, arranged for extension in any one of three directions. The new shop will contain one box, 30-ton, 4-motor, electric traveling crane, with a 5-ton auxiliary hoist. The power plant is already installed. An electric group drive will be used for all old tools and new ones to be purchased will in some cases be independent motor driven and in others belt driven. The company is bringing out a line of gas engines, the smallest size developing 100 horsepower in one cylinder. The engine will be of the two-cycle, double acting type, which has been undergoing development for a number of years. The company for the present will continue to manufacture its complete line of steam engines in the old works.

The Alabama Great Southern is soon to begin work at Gadsden, Ala., on extensive car manufacturing shops. The repair shop force is to be immediately increased, and the plant, it is stated, will employ 1,500 men.

Frederic B. Stevens is to erect a foundry facings mill at Detroit, Mich. It will be 80 x 163 feet, three stories high and will cost $75,000.

The Calkins Stove Mfg. Co., recently incorporated at Columbus, O., for the manufacture of gas stoves, has purchased a site on South High street, of that city, and will erect a factory with a daily capacity of 50 stoves.

The Ohio Mfg. Co., now located at Upper Sandusky, O., has purchased a tract of five acres at Columbus, O., adjoining the plant of the United States Hoe & Tool Co. It will erect two large buildings 150 x 350 feet, and will be ready for operation Nov. 1, manufacturing gasoline motor passenger and freight cars and various machinery.

The International Harvester Co. has bought two tracts of land, comprising about 18 acres, at West Pullman, in the Calumet district, Chicago. The price paid was $60,000, it is understood, and extensive enlargements of the Plano works and the installation of a large lumber yard are planned.

The Alliance Machine Co., Alliance, O., has broken ground for a large addition, 100 x 120 feet, of brick and steel. New boilers will be installed in the power plant and considerable new machinery will be added.

General Industrial Notes:—

The Pioneer Steel Co., recently incorporated at Rockford, Ill., succeeds an unincorporated company of the same name, which in turn was successor to the business of the Inter-State Steel Co. Soft center carbonized steel is manufactured for the agricultural implement trade.

Indications are that the Ohio River & Western railroad, extending from Zanesville to Bellaire, O., will soon pass into the control of the Hocking Valley railroad, and will be changed to a standard gauge road.

The production of zinc during 1905, according to the Geological Survey, was 203,849 short tons, an increase of 17,147 short tons over the 1904 production.

Samuel G. Colt, of Pittsfield, Mass., has purchased the plant of the Richmond furnace at Cheshire, which has been idle for the past 13 years. All necessary repairs will be made and the furnace placed in operation, making charcoal iron to be used exclusively for the manufacture of car wheels and engine cylinders. From 50 to 75 men will be employed at the works.

The Phelps Iron Ore Co., Rolla, Mo., is now mining about 125 tons of ore daily and expects to double its output within a short time as a fine face of ore is showing. Six and one-half miles of railroad, from Winkler to the mines, have been completed and a

number of houses are being built for employes.

The Niagara Falls Power Co. has been granted a temporary permit by Secretary of War Taft, to take 8,600 cubic feet of water per second from above the falls. The Nigara Power Co. is to get 4,000 cu. ft. a second, and the Lockport Hydraulic Co. 833 cu. ft. from the Erie canal. The law limits the amount of water which can be taken to 15,600 cu. ft. per second.

Gary, Ind., has been declared a legally incorporated town. Thirty-six favorable votes were cast at the recent election on the incorporation issue, with only one opposed.

The work of investigating the coal and oil deposits of the United States, under the direction of the geological survey, is being conducted on an extensive scale during the summer, with M. R. Campbell in charge. Particular attention will be paid to Pennsylvania, West Virginia, Eastern Kentucky, Virginia, Alabama, Illinois and the Rocky Mountain region. The corps of experts engaged in the work is large.

Suit has been brought by the Parke County Coal Co., at Terre Haute, Ind., against Joe Martin, former president, for an accounting. It is charged that he used this company to make separate profits for himself and friends through a Chicago concern known as the Bedford Coke & Coal Co.

Furnace A of the Maryland Steel Co., at Sparrows Point, Md., has gone out for relining.

The Shand Engineering Co., Columbia, S. C., recently incorporated, will do general professional engineering work. George E. Shand, E. F. Lilly and George Lafaye comprise the staff.

The Frank C. Patton Co., Sycamore, Ill., has been forced into bankruptcy with liabilities of $424,342 and assets slightly less. The company owns a foundry in Sycamore where it manufactures farm implements.

The plant of the Shaw Machine Co., Lowell, Mass., built and equipped during the past twelve months, will be sold at auction on Wednesday and Thursday, July 25 and 26. The company was incorporated in July, 1905, for the purpose of building textile machinery, especially for worsted machinery. The plant is equipped with machinery and tools of the latest type and was intended to give employment to about 600 men. The sale will be conducted by Henry E. Warner, receiver for the company.

Large machines for charging and drawing are to be installed at the two bar mills in the Valley plant of the Republic Iron & Steel Co., Youngstown, O.

The Brier Hill Iron & Coal Co., Youngstown, O., is completing the work of installing a new William Tod blowing engine. Other improvements will be made later.

The Geological Survey announces the product of clay in the United States during 1905 as valued at $149,697,188 as against $131,023,248 in 1904. Of this $121,778,294 was for brick and tile.

The plant of the Puget Sound Iron Co., at Irondale, Wash., will be sold to the highest bidder by Receiver M. J. Carrigan on Sept. 6.

A petition in bankruptcy has been filed by creditors of the Janney Mfg. Co., Columbus, Ind., which has been in the hands of a receiver for some time. The company moved to Columbus about a year ago from Ottumwa, Ia., The Rogers Iron Co., of Cincinnati, is one of the petitioners.

The Claire Coke Co., recently organized with James A. Bennett, of Greensburg, Pa., as president, and Lawrence E. Walters as secretary and treasurer, has purchased the coking properties owned by Joshua W. Rhodes & Co., of Pittsburg. There are 100 coke ovens now in operation, and it is expected that 50 more will be added.

The Cyclone Woven Wire Fence Co., Waukegan, Ill, has been purchased by the company known as the Cyclone Fence Co., of which J. P. Arthur is president. James Slomer and R. R. Reaume are associated with him.

Fires and Accidents:

The tipple, washery, oil house, fan house and blacksmith shop at the No. 4 plant of the Jamison Coal & Coke Co., Greensburg, Pa., were destroyed by fire July 18, causing a loss of $75,000. The plant will be immediately reconstructed.

The bursting of a cinder buggy at the Dunbar, Pa., plant of the Dunbar Furnace Co., July 18, caused the death of one workman and the serious injury of another.

The main building of the Standard Chain Works at St. Marys, O., was destroyed by fire July 21. An explosion of gas in one of the furnaces started the blaze. The loss is estimated at $40,000.

The plant of the American Equipment Co., at Norristown, Pa., was destroyed by fire believed to have been of incendiary origin on July 16. The loss, at about $25,000, is covered by insurance. Operations at the plant were begun about a year ago by Alfred Major, formerly president of the American Bridge Co.

The Stamford Motor Works at Stamford, Conn., was damaged by a windstorm on July 17 to the extent of several thousand dollars. The roof was torn off, carrying with it the shafting, and deposited 50 feet clear of the building.

Trade Notes:—

The Ohio Forge Co., Toledo, O., has been adding considerable equipment of late, including a 1,500-pound Lane steam drop hammer, increasing its capacity over fifty per cent. Since its organization three years ago this concern has made remarkable strides, having quadrupled its output in that time. It makes a specialty of automobile parts in complicated shapes.

The Herzog Iron Works, St. Paul, has charge of the iron work on the Orpheum theater building in that city. Work has been delayed by a scarcity of workmen, but the construction is now being pushed and will probably be completed by September.

The steamer Powell Stackhouse with 9,700 tons of soft coal was unloaded recently at the dock of the Milwaukee Coke & Gas Co., by two "Brownhoist" steam rigs equipped with two-ton grab buckets in 39 hours actual working time, an average of 249 tons per hour or 124½ tons per hour per rig. The unloading of the entire cargo, including the cleaning up, was done by grab buckets, and for the first ten hours each machine averaged 160 tons per hour.

The Denver offices of the Allis-Chalmers Co. have been moved to the McPhee building, Seventeenth and Glenara streets, and the El Paso office to the Guarantee Trust building, rooms 301-306.

The Isthmian Canal Commission has let the contract to Woodward, Wight & Co., New Orleans, for 240,000 pounds of No. 1 foundry pig iron, and 400,000 pounds of No. 2 for delivery at Colon at its bid of $5,520. The Pocahontas Coke Co. secured an additional contract for 600,000 pounds of coke delivered at Lambert's Point at $1,320 and $2,520, delivered at Colon.

The Allis-Chalmers Co. reports the sale during the first two weeks of July of 20 steam engines for shipment into 14 different states. Of the 20 engine units ordered, 12 were of the Reynolds reliance Corliss type, two of the Reynolds girder Corliss type, two were hoisting engines, two of the Reynolds heavy duty, cross compound condensing type, one was a Reynolds heavy duty Corliss engine and one a Reynolds combined horizontal and vertical engine.

Puddling Rate.—The bi-monthly settlement between the Western Bar Iron Association and the Republic Iron & Steel Co., with the Amalgamated association recently showed the puddling rate for July and August will be on the 1.5 card or $5.75 per ton, 25c lower than the preceding two months.